Fire Weather Annual Report
Southeast Idaho
2015

Pocatello Fire Weather Office
Pocatello, Idaho

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service

2015 Fire Weather Annual Report

National Weather Service – Pocatello Fire Weather Office

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Pocatello, ID 83204

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1. Introduction:

The National Weather Service, Weather Forecast Office at Pocatello, Idaho has Fire Weather Forecast responsibility for portions of Idaho serviced by the Central, Eastern and Southern Interagency Dispatch Centers (Figure 1). The Pocatello Fire Weather Office produces this Annual Fire Weather Report. Previous reports are maintained up to five years.

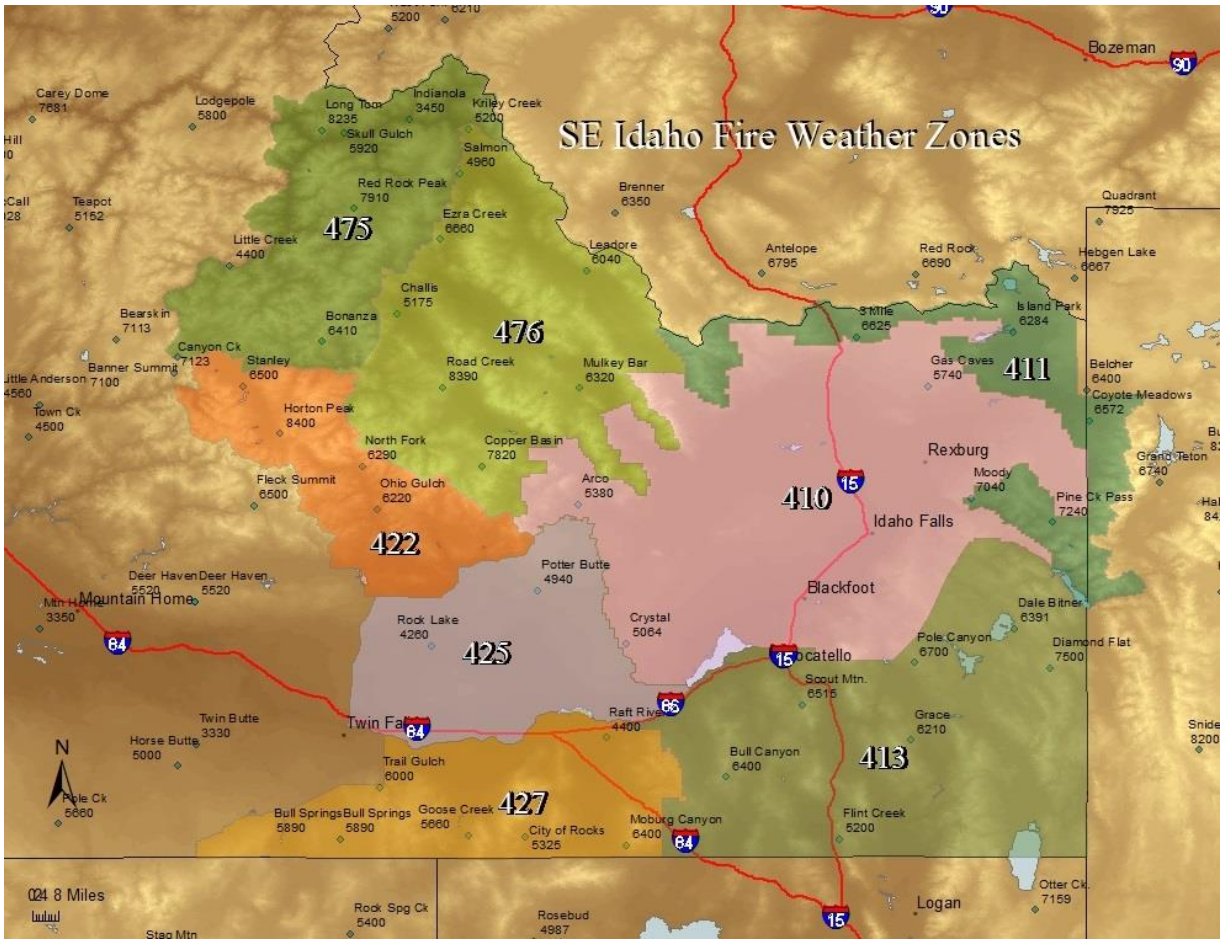

Figure 1 WFO Pocatello Fire Weather area of responsibility (solid color areas).

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2. Overview of the fire season:

The El Niño/Southern Oscillation Index (ENSO) remained in a neutral state through the winter of 2014-2015, but slowly gained strength. Southeastern Idaho got off to a good start with a winter storm system in the middle of November that brought 8 to 15 inches of snow to the mountains and up to 2 feet of snow on some peaks above 8500 feet elevation. Four inches of snow fell in Pocatello. Another big storm system arrived Christmas Day. Snow accumulation of 2 to 6 inches fell in the lower valleys and up to 18 inches in the mountains. The persistence of high pressure along the coastal regions from California to Alaska prevented cold Polar air from reaching this area (Figure 2.1).

The El Niño/Southern Oscillation (ENSO) cycle occurs over a two to seven year period and refers to conditions of sea surface temperatures in the tropical Pacific Ocean. Researchers have identified other cyclic patterns besides ENSO around the globe that may affect long term weather patterns. Some of these cyclic patterns may span 10 or even 30 years. La Niña (colder than normal) and El Niño (warmer than normal) are terms associated with extremes in the ENSO cycle. The ENSO cycle has a strong influence on global climate patterns and is a major player in long term climate outlooks.

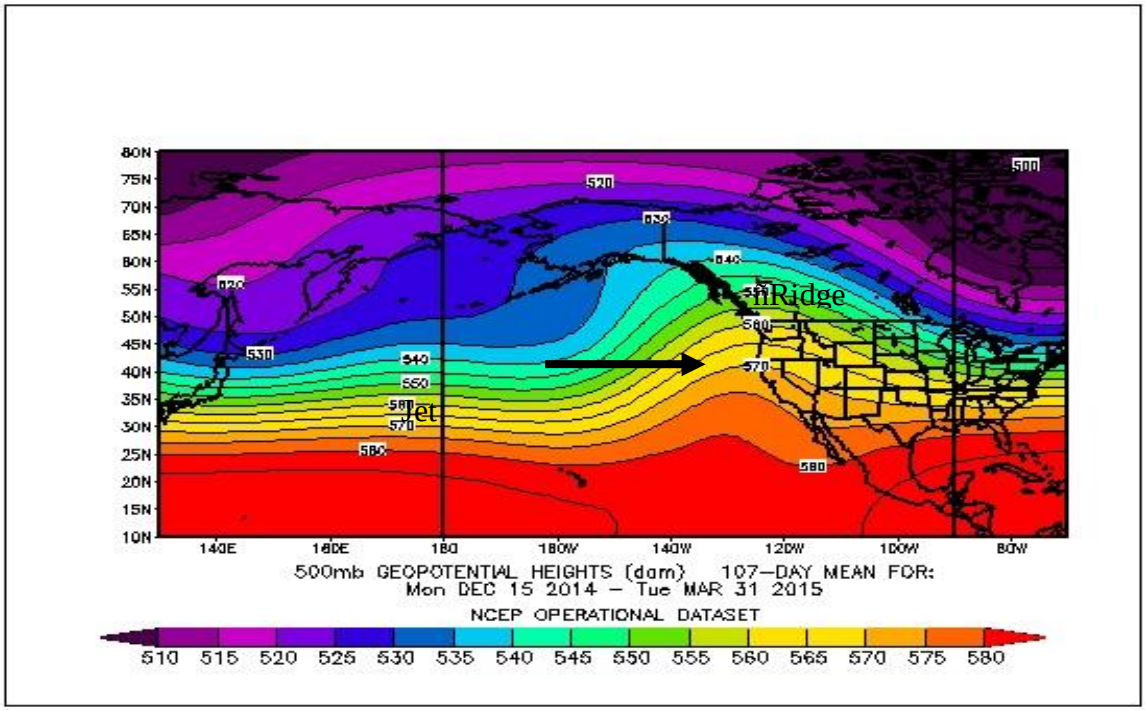

Figure 2.1 Department of Commerce, National Oceanic and Atmospheric Administration, ESRL composite reanalysis of 500 mb geopotential height pattern for December 15, 2014 through March 31, 2015. The upper level high pressure ridge extending from California to Alaska was strongly amplified similar to 2013-2014 winter. The warm air off the Pacific resulted in above normal temperatures and elevated snow levels in Idaho.

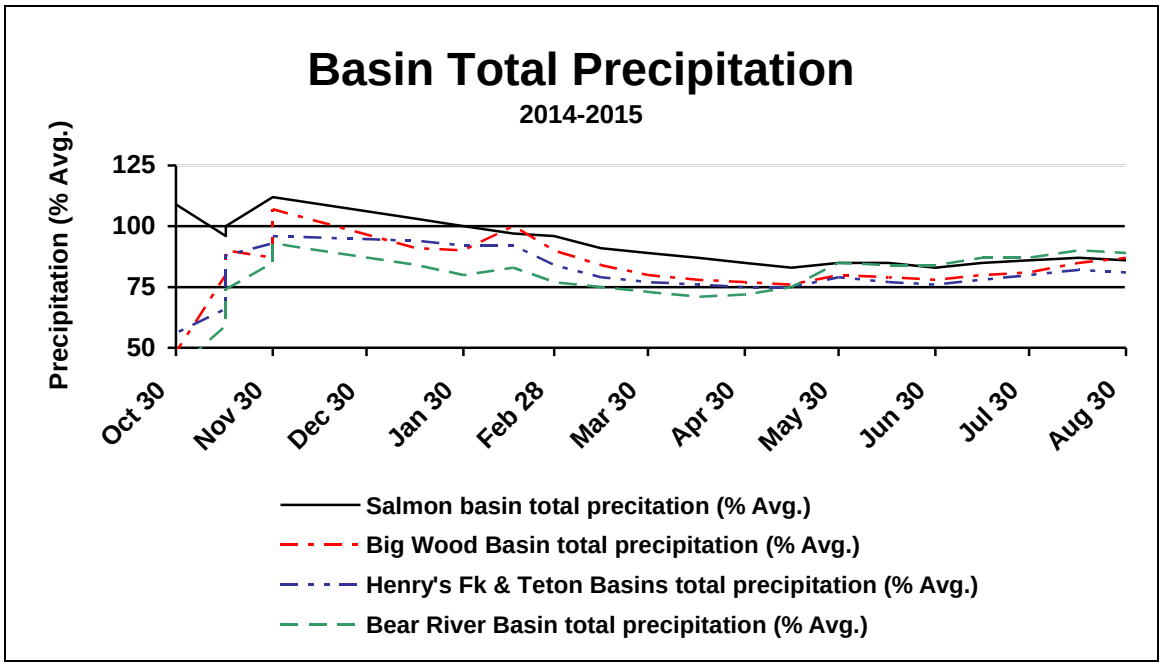

Figure 2.2a Total precipitation for select Southeast Idaho Basins. Data source is from the USDA Natural Resources Conservation Service, National Water and Climate Center, Portland Oregon.

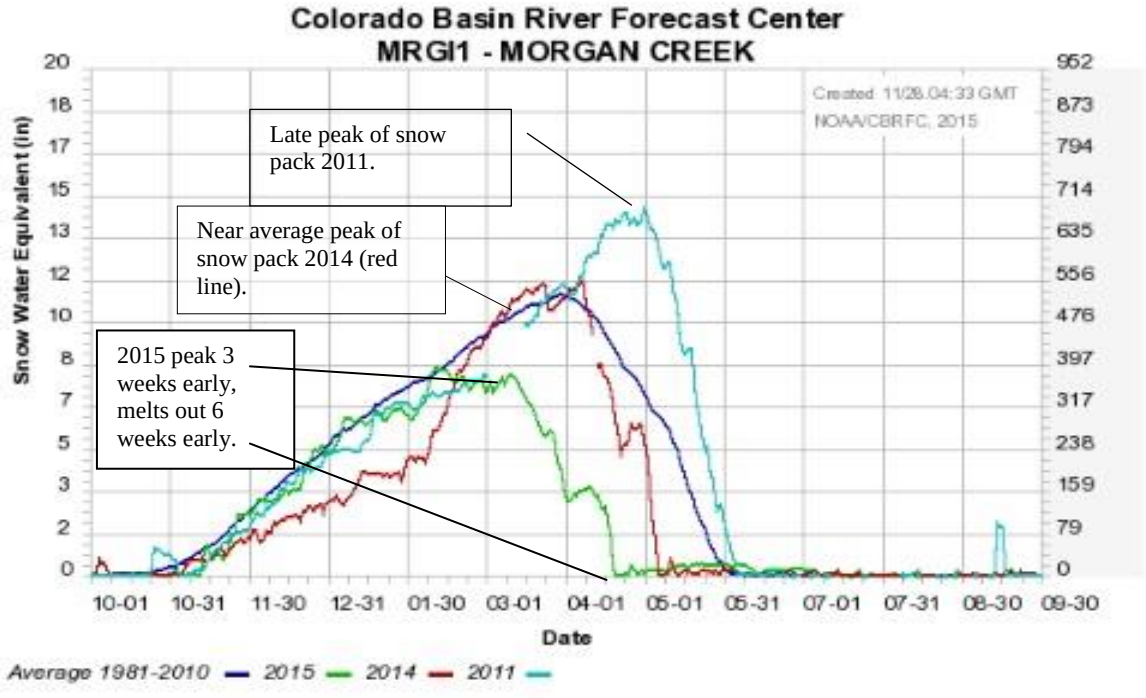

Figure 2.2b Snow packs of 2015 (green line) peaked about 3 weeks earlier than average and with about a third less total snow water equivalent. This site completely melted out about 6 weeks earlier than average (dark blue line). The more substantial snow packs of 2011 (light blue line) are shown for reference. Source: National Weather Service, Colorado Basin River Forecast Center. Morgan Creek is a telemetered snow reporting station of the National Resource Conservation Service, located at 7600 feet elevation on Morgan Creek Road about 24 miles north of Challis, Idaho.

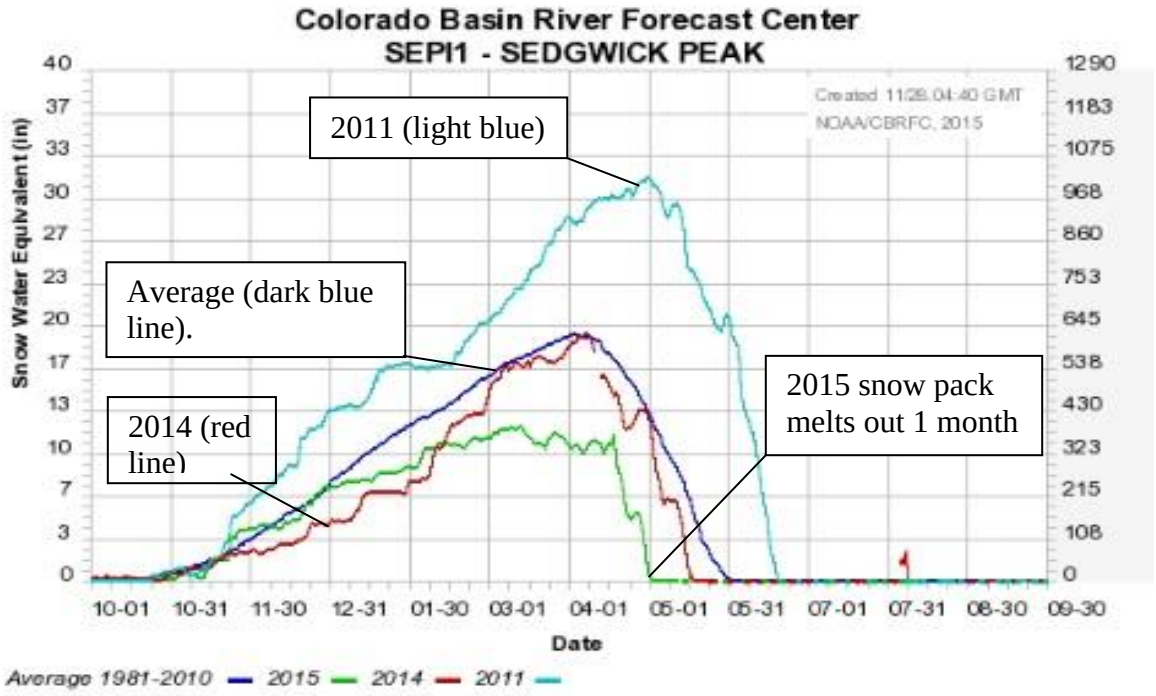

Figure 2.2c Sedgwick Peak SNOTEL located near Franklin Basin Road, about 1.9 miles west of Sedgwick Peak, Idaho, elevation 7850 feet. The snow packs contained significantly less water content and melted out about one month early this year (green line) compared to average (dark blue line) and 2014 (red line). The more substantial snow packs of 2011 (light blue line) are shown for reference.

The predominant westerly storm track off the Pacific would begin to take its toll over the next few months by bringing warm air into Idaho and raising snow levels substantially. The overall downward trend of basin snow packs became evident (Figure 2.2a). El Niño became fully established by the 5th of March, but by then the snow packs were melting out in the lower elevations. Many locations were up to 6 weeks ahead of the average pace. The automated snow pack (SNOTEL) reporting site at Morgan Creek near Challis (Figure 2.2b) peaked about the first week of March and then melted off rapidly. The timing of the "peak" and the lower than average amount of water stored in the snow packs suggest an early fire season might lie ahead for portions of the Challis and Sawtooth National Forests. However, as we will see later, this is just one part of the story. Snow melt at Sedgwick Peak SNOTEL site located south of Lava Hot Springs shows a similar pattern of low water content in the snow packs and early melting (Figure 2.2c).

Just how warm the air was can be seen from temperatures averaged over the 3 winter months from December to February (Figure 2.3). Nearly all of the Salmon-Challis Forest, Sawtooth Forest, and Caribou-Targhee Forest were 6 to 8 degrees Fahrenheit above normal.

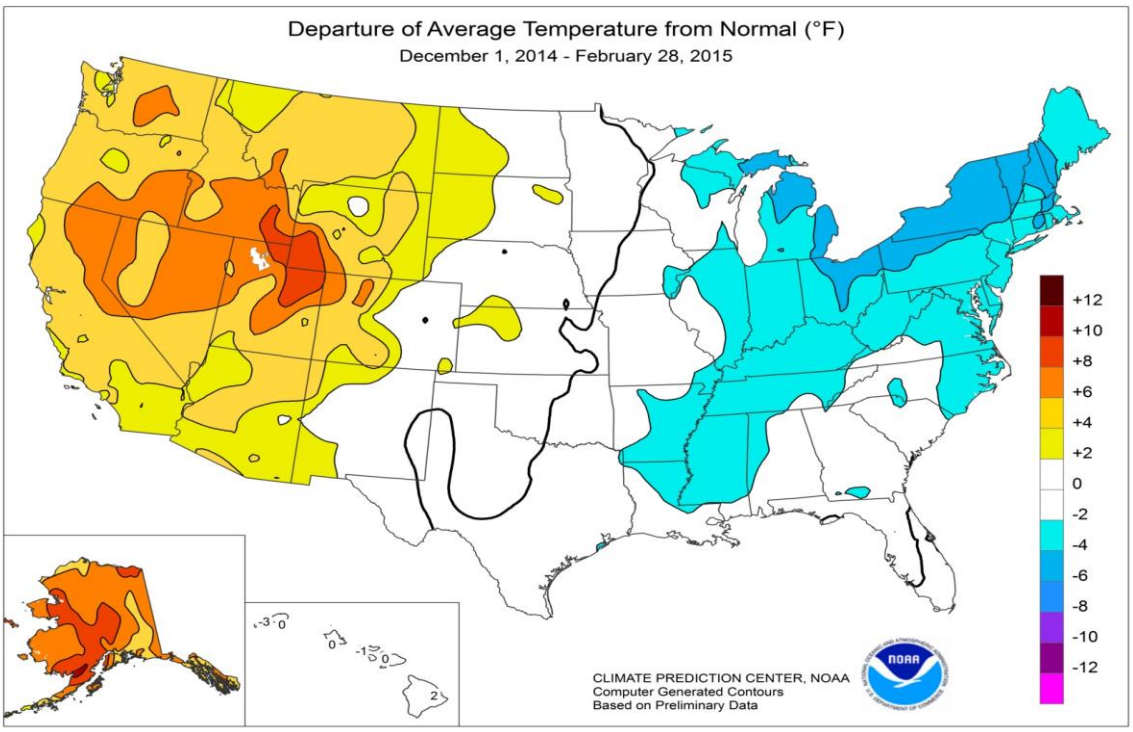

Figure 2.3 Temperature anomalies (F) for a 90 day period ending February 28, 2015, from Climate Prediction Center, National Oceanic and Atmospheric Administration.

The Idaho basin oriented graphics for snow water equivalent (Figures 2.4a and b) show just how dramatic the change in snow pack was over the entire state. The November and December storm track favored the southern Idaho border area from Bruneau Basin to Bear Lake Basin where snow packs ranged from 124 percent to 194 percent of the median. By the end of March, snow levels were rising to 6500 to 7000 feet elevation, and the lower basins like the Little Wood, Blackfoot and Portneuf were less than half their typical values. The headwaters area of the Snake River above Palisades and Henry's Fork/Teton basins fared the best, but were still showing a deficit in snow packs.

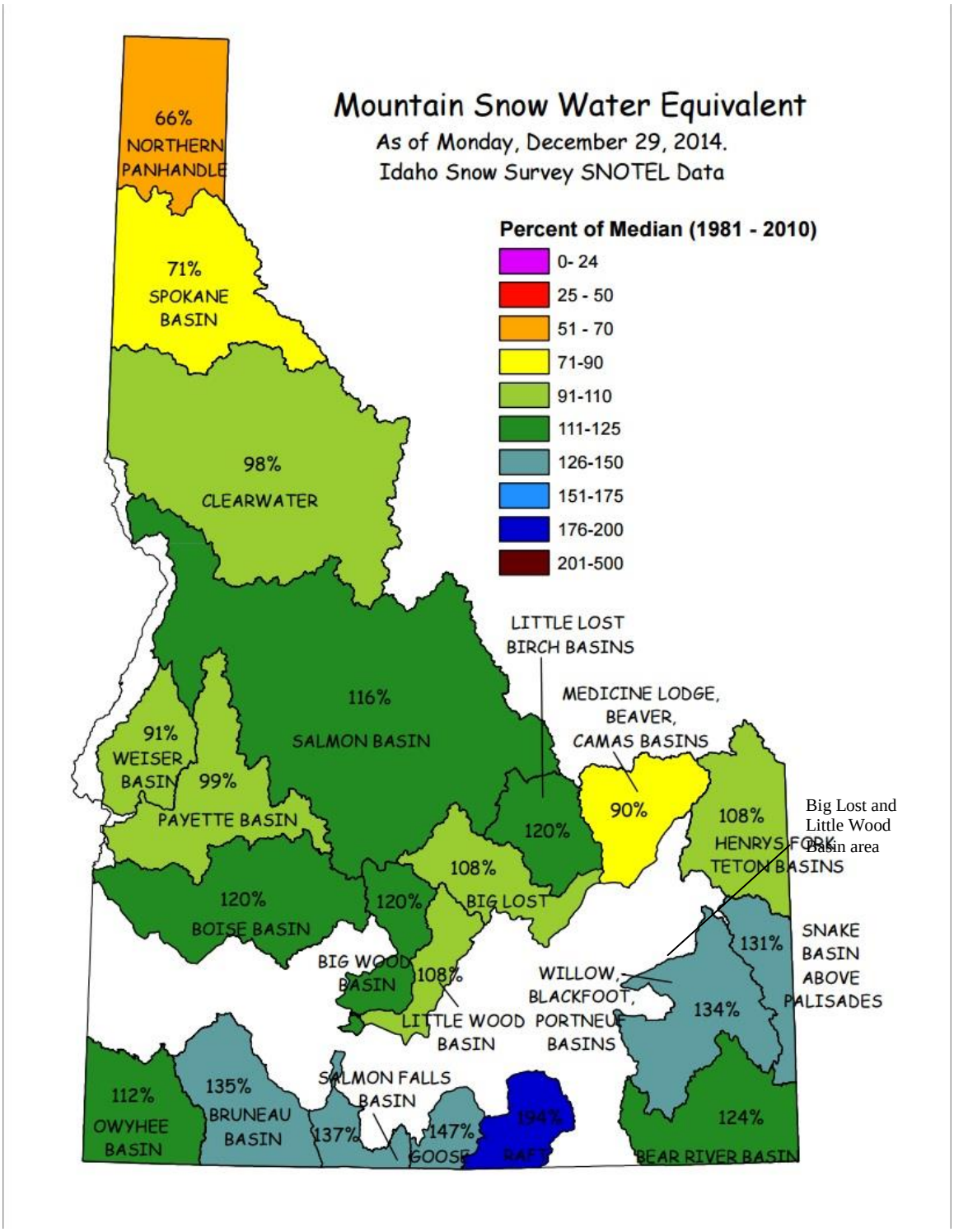

Figure 2.4a Mountain snow packs as determined from snow water equivalent. From USDA Natural Resources Conservation Service, National Water and Climate Center, Portland Oregon.

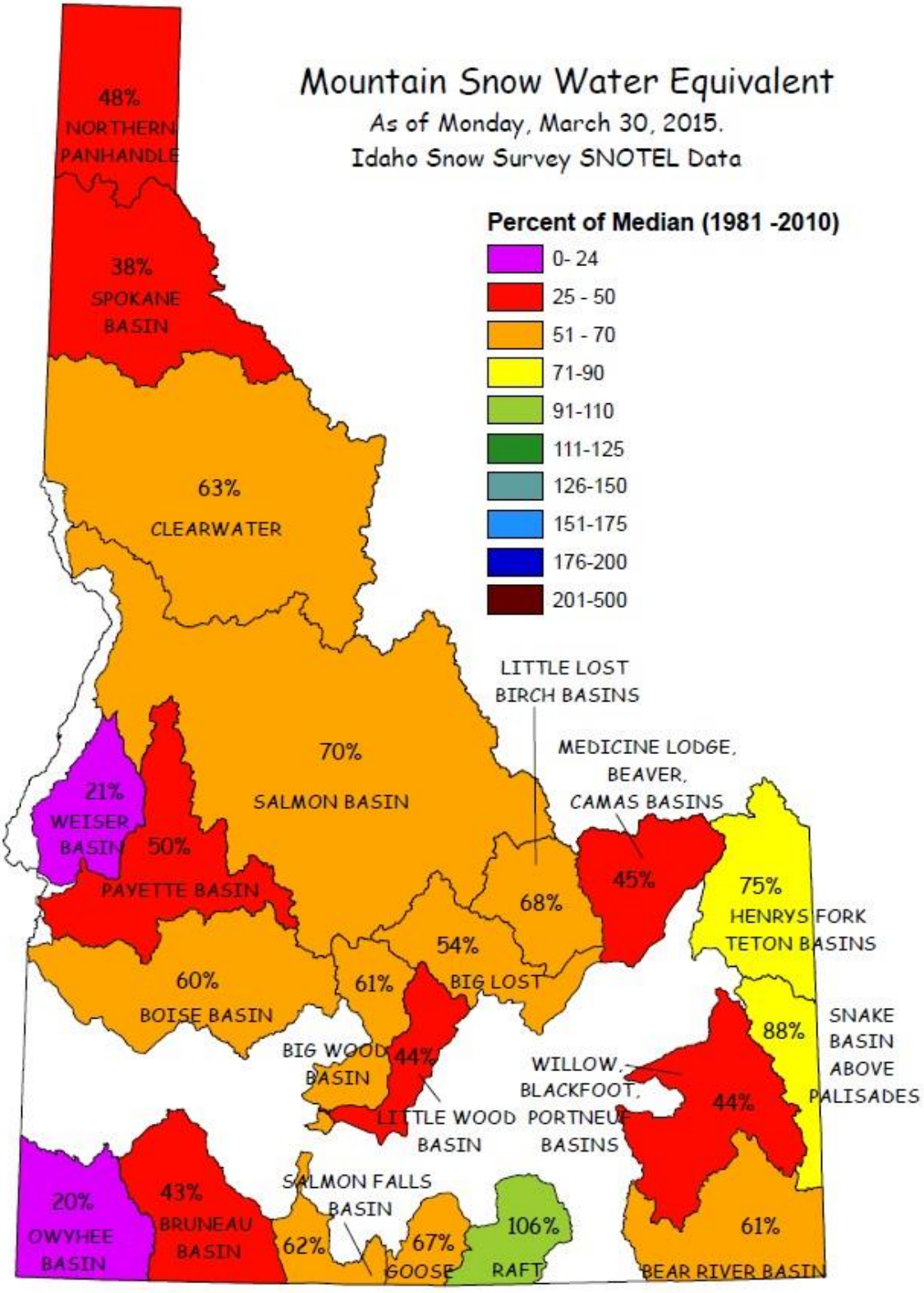

Figure 2.4b Mountain snow packs as determined from snow water equivalent. From USDA Natural Resources Conservation Service, National Water and Climate Center, Portland Oregon.

Above normal temperatures continued through the months of April and May, which accelerated the melting of mountain snow packs. With respect to total precipitation, April was below normal in most areas while May saw well above normal precipitation falling as rain over the Snake Plain, Caribou-Targhee Forest, and southern portions of the Sawtooth Forest (Figure 2.5a). May precipitation reported at Burley, Pocatello, and Idaho Falls was 2.3, 1.48, and 2.1 inches above normal, respectively. The last three weeks of June were very dry, including record high temperatures towards the end of the month. The National Weather Service Office in Pocatello reported a record high temperature of 101 degrees Fahrenheit on June 28th.

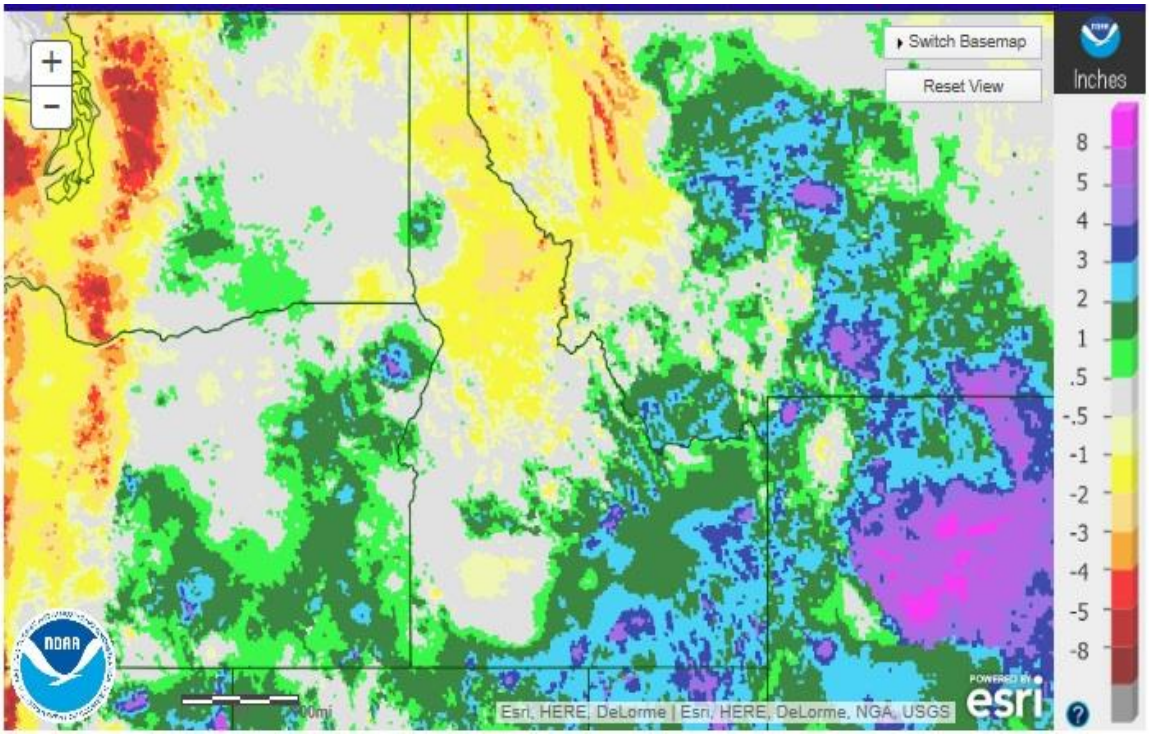

Figure 2.5a Advanced Hydrologic Prediction System (AHPS). Departure from normal precipitation for May 2015. The Arco Desert, Caribou-Targhee Forest, and the southern portion of the Sawtooth Forest received ample rain.

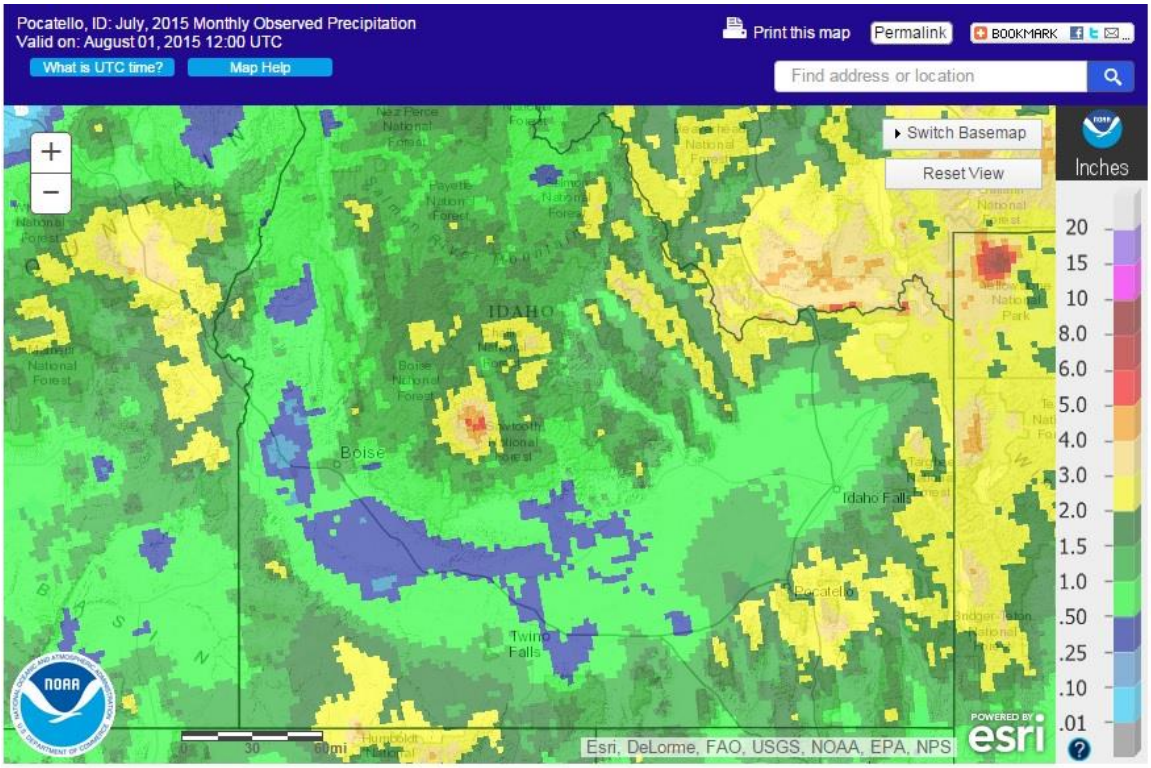

Figure 2.5b Advanced Hydrologic Prediction System (AHPS): July, 2015 Monthly Observed Precipitation, several disturbances crossed California into the Great Basin.

The heart of the fire season could have been a mixed blessing. There were quite a few days with isolated to scattered showers and thunderstorms. Precipitation was above normal for both July (Figure 2.5b) and August. The majority of disturbances approached from the west rather than a more southerly direction associated with the monsoon season. Live fuel moistures at Dubois and Coffee Point began a sharp decline in June, but then leveled off or even increased slightly in July and August (Figures 3.6a and b).

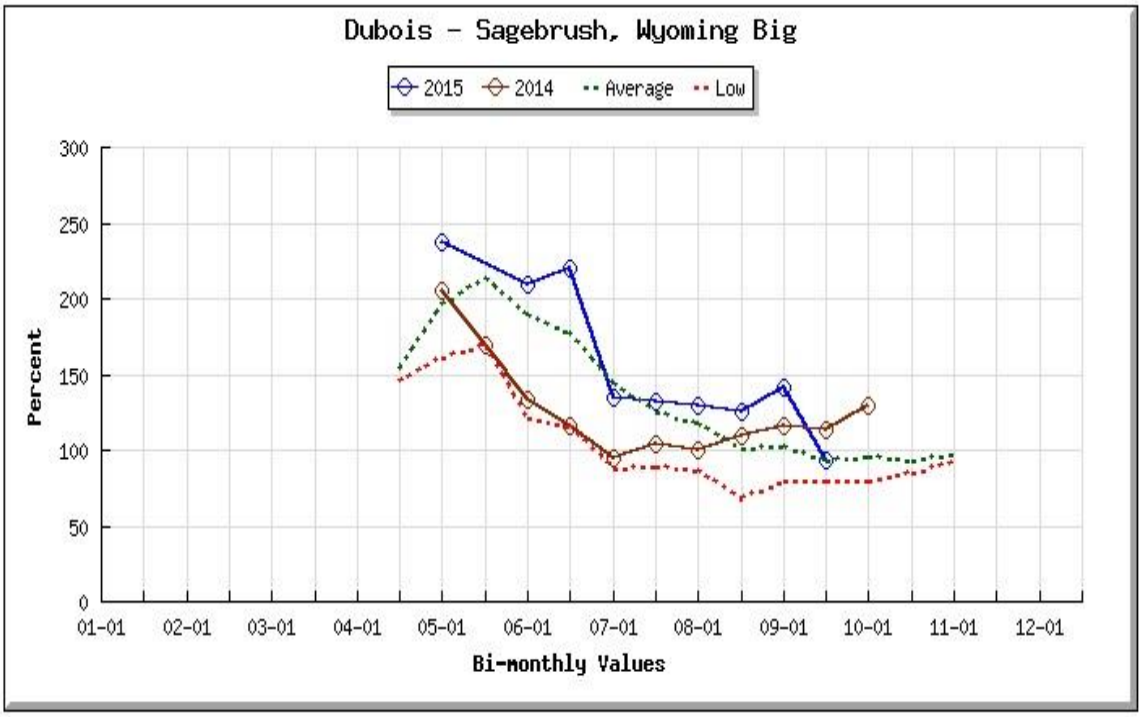

Figure 2.6(a) National Fuel Moisture Data Base, for Wyoming Big Sage Brush (Gas Caves RAWS station) near Dubois, Idaho.

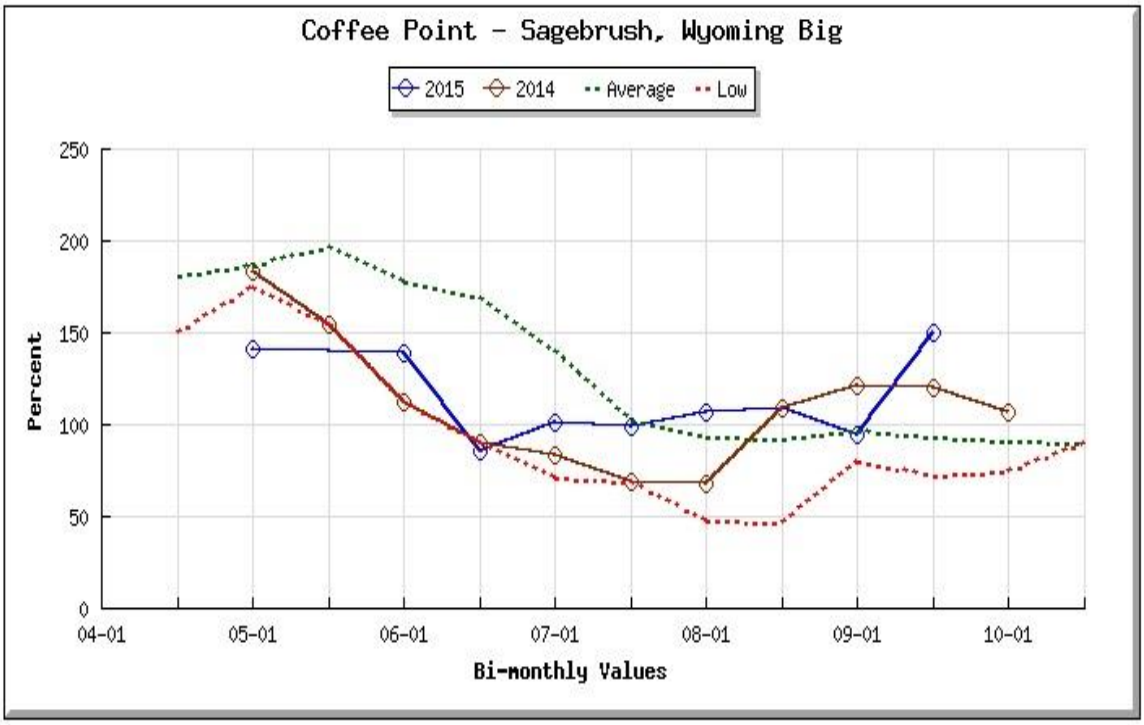

Figure 2.6(b) National Fuel Moisture Data Base, for Wyoming Big Sage Brush at Coffee Point (Crystal RAWS), northwest of Sterling, Idaho.

Short term drought conditions as measured by the Keetch-Byram Drought Index (Figures 2.7a and b), showed soil conditions in southeast Idaho remained fairly moist with very little drying taking place, mostly in the middle Snake River Valley, over the course of the summer. Long term drought conditions persist in the central mountains following two years of above normal winter temperatures and loss of snow packs on the middle and lower slopes. This is highlighted by the Palmer Drought Severity Index (Figure 2.9).

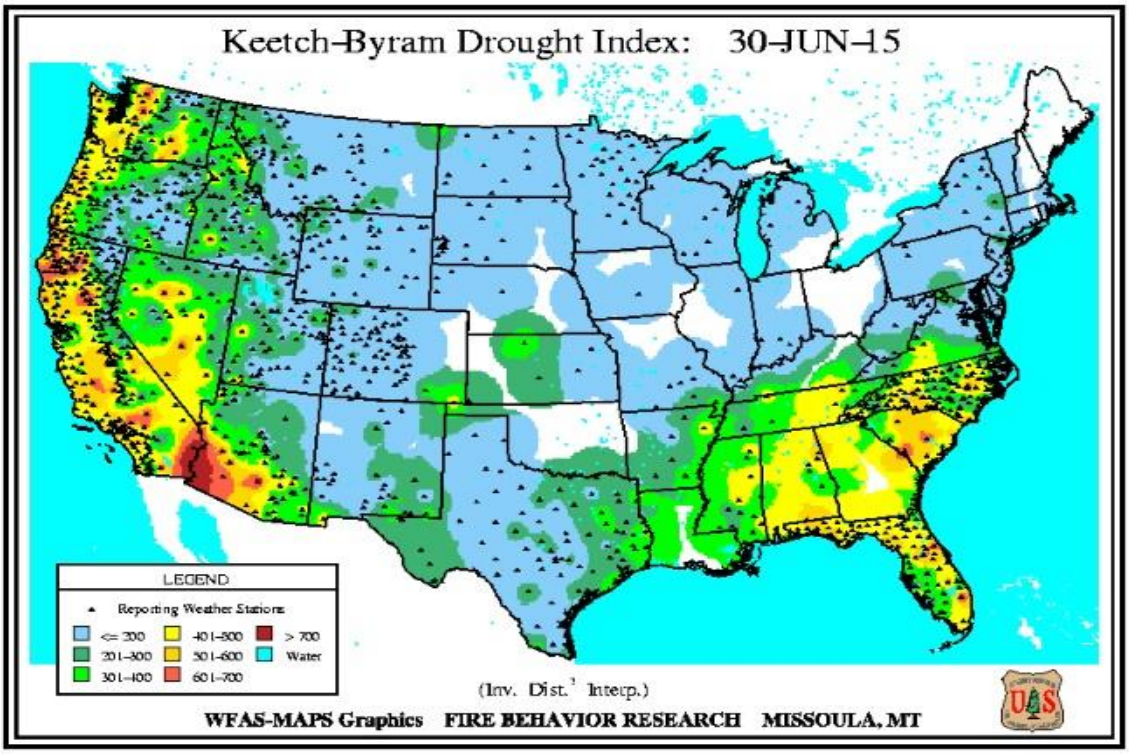

Figure 2.7(a) Keetch-Byram Drought Index reflecting more short term drought conditions, i.e. evapotransporation and near surface soil moisture. Valid June 30, 2015.

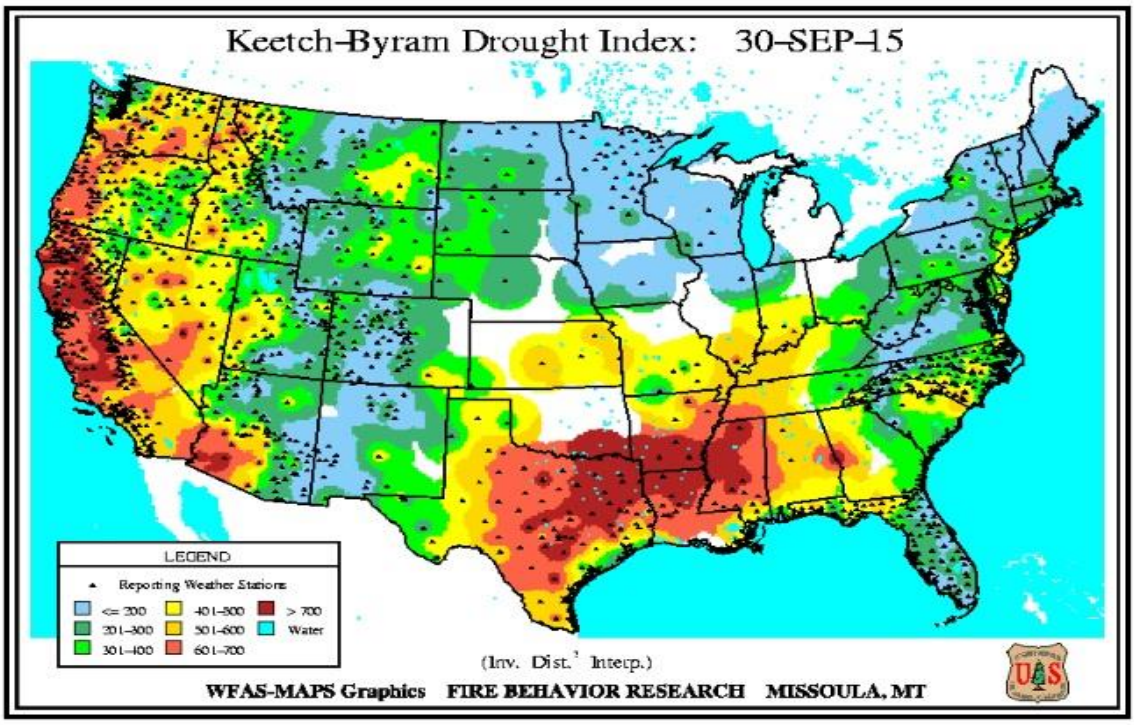

Figure 2.7(b) Keetch-Byram Drought Index reflecting more short term drought conditions, i.e. evapotransporation and near surface soil moisture. Valid September 30, 2015.

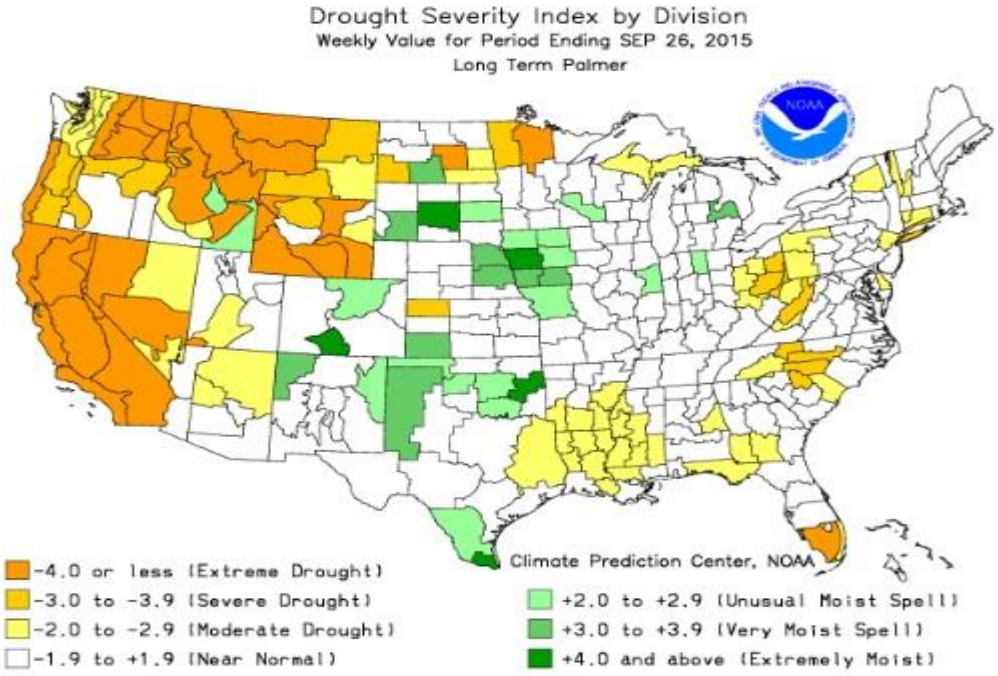

Figure 2.8 Palmer Drought Severity Index (September 2015) measuring long term meteorological conditions over many months.

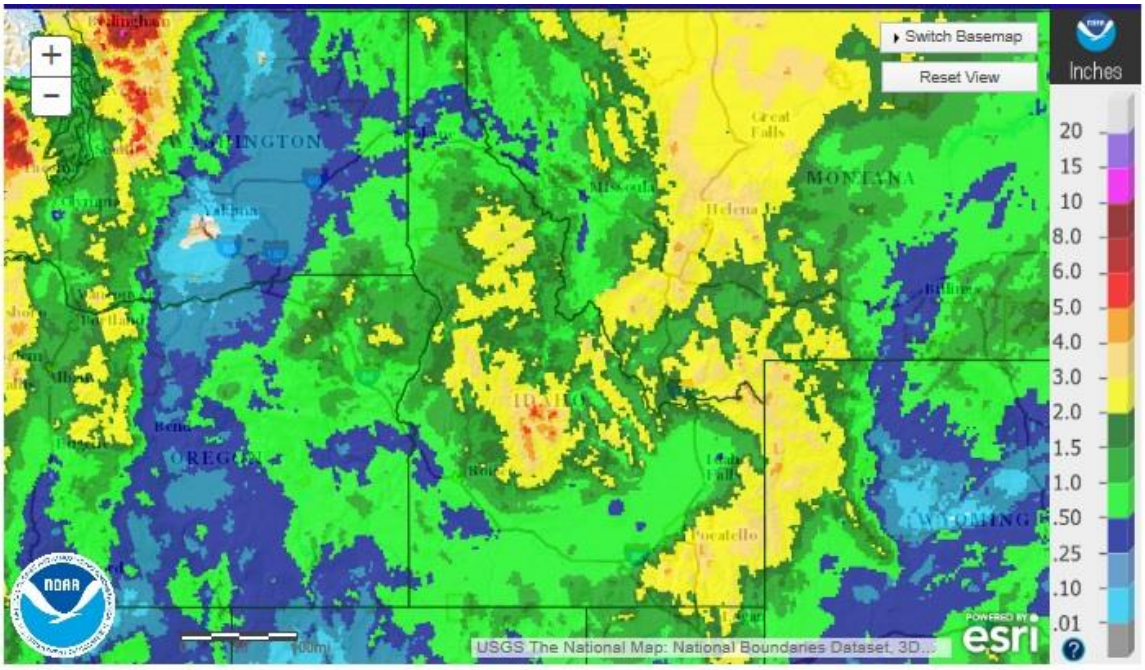

Figure 2.9 Advanced Hydrologic Prediction System (AHPS): Observed monthly precipitation for September, 2015. Most all of the monthly total precipitation was associated with two weather disturbances; the first on September 3-6, and a second disturbance that brought widespread showers to southeastern Idaho between September 14 and 17, 2015.

Season ending events are not always straight forward. Most of the rain in September resulted from just two events, with widespread showers occurring between September 14th and 17th (Figure 2.9). The remainder of September through the first three weeks of October was pretty warm and dry. Afternoon high temperatures continued in the 70's and 80's. Minimum relative humidity in the Arco Desert and Southern Snake Plain would at times dip to the 9 to 15 percent range. The combination of two weather systems, one on October 19-20th and the second October 29th through November 5th, lowered temperatures into the 40's to help end the season.

3. Weather in review: October 2014 – September 2015

October 2014. The 2014 fire season concluded with a strong low pressure system entering the Pacific Northwest between September 26th and October 2nd. This storm system brought widespread rainfall ranging from 1 to 2 inches across southeastern Idaho and lowered the afternoon high temperatures to the lower to middle 60F range. A moderately strong disturbance tracked through Oregon and the Idaho Panhandle October 15th and 16th, bringing scattered showers to the Idaho Central Mountains and Upper Snake Highlands. Afternoon temperatures rebounded to the 70's for a few days under warm and southerly winds. A cold front swept the area on October 21st, followed by a stronger disturbance October 23rd through the 27th. Stanley, Idaho reported 0.38 inches precipitation on the 21st and 0.71 inches from the second disturbance. Much of this precipitation fell as rain below about 7000 feet elevation; the snow level fell briefly to near 6000 feet elevation on the 27th. These last two disturbances brought just a trace to 0.03 inches precipitation to the Snake Plain.

November and December 2014. A low pressure disturbance off the Pacific brought scattered showers on November 2nd and 3rd, some with up to a quarter inch of precipitation. Snow levels still remained elevated with this disturbance, but that began to change as the next few systems dropped southward from Canada. A storm system on November 10th and 11th brought little precipitation, but lowered daytime highs in the Upper and Lower Snake Plain to the 30's and 40's. The following disturbance on November 13th to 15th brought 0.50 to 1.0 inch liquid precipitation equivalent to much of the area. The National Weather Service Office at the Pocatello Regional Airport reported 4.6 inches of snow and morning low temperatures in the single digits were common through the Upper and Lower Snake Plain for a week. The National Weather Service Office in Pocatello reported record morning low temperatures of 1F on both the 12th and 13th, and just 1 below zero on both the mornings of the 17th and 18th. The cold spell broke around the 18th with westerly winds off the Pacific once again warming afternoon temperatures to the 40 to 60F range. Minor disturbances embedded in the westerly flow off the Pacific would trickle through every couple days until about the 8th of December. In contrast to the record low temperatures; Pocatello Airport reported a record high of 62F on November 27th and 60F on the 28th. These warmer temperatures continued through the month of December with most of the Snake Plain about 8 degrees above normal for the month. On December 25th, 5.6 inches of snow fell at the Pocatello Airport. The embedded disturbances in westerly winds off the Pacific favored the southern border area of the state; in particular, mountain snow packs in the Bruneau, Salmon Falls, and Oakley basins ranged from 145-165% of normal. Snow packs in the central mountains and Upper Snake basin were 100-120% of normal.

January 2015. The El Niño Southern Oscillation Index remained neutral through the fall and early winter months, although there was anticipation of moving towards El Niño conditions. For most of January, high pressure gained dominance over Washington, Oregon and Idaho. This resulted in warmer and drier than normal conditions. Observing stations reported monthly precipitation amounts that were near normal to about a half inch below normal, while average temperatures ranged from 4.6 to 5.8 degrees above normal. There were two significant precipitation events this month. The first occurred

January 4th and 5th when a disturbance crossing central and northern Idaho spread a mix of rain and snow across the Salmon-Challis and Targhee Forest areas. Stanley, Idaho measured 0.33 inches water equivalent precipitation. The second storm system arrived January 15th to 18th and affected all of Southeast Idaho. Stanley, Idaho reported 0.97 inches liquid equivalent precipitation; and Pocatello Airport, 0.17 inches. The Little Wood, Big Lost, and Portneuf basins received only 35 to 40 percent of median precipitation for the month. The Salmon Falls and Oakley basins lost some ground, but still remained above average. The warmer than normal temperatures resulted in some mountain snow packs melting.

February 2015. The first nine days of February, southeastern Idaho benefitted from rather moist air streaming off the Pacific. Stanley Idaho reported 1.80 inches of liquid water equivalent precipitation. The remainder of the month Stanley reported just 0.03 inches, which occurred on the 26th. Unseasonably strong high pressure developed from Oregon to British Columbia and eastward into Idaho. This resulted in monthly mean temperatures about 10 degrees above normal for most of southeastern Idaho. Much of the precipitation that fell, did so as rain, and snow packs in many areas melted out. New record high temperatures were set on at least 10 different days, somewhere in southeastern Idaho. Snow packs in the Goose Creek and Raft River basins held on at 91 to 115 percent of median. Elsewhere, areas along the Montana border fared well, including the Salmon, Little Lost/Birch Creek, Henry's Fork, and Snake basin above Palisades ranging from 89 to 103 percent of median.

March 2015. Warm waters continued to build up along the coast of Central and South America, along with the unusually warm waters pooled of the coast of North America. The NOAA Climate Prediction Center on March 5th, declared that full El Niño conditions had developed. A strong ridge of high pressure near the Pacific Northwest Coast moved slowly inland during the first ten days of March. A few showers were noted along the Continental Divide and the highlands along the Idaho and Wyoming border. Otherwise, little to no rain fell in southeastern Idaho. Between March 11th and 22nd, very moisture rich air streamed off the Pacific (in recent years this has been termed an "atmospheric river") to bring substantial rains to northern Idaho. Unfortunately, most all of this rain fell between Salmon and the Idaho Panhandle region. Southeastern Idaho did receive some rain on March 23rd and 24th when this band of precipitation briefly slipped southward. Two-day rain totals at Stanley, Challis, and Pocatello were 0.49, 0.16, and 0.10 inches, respectively. Temperatures for the month of March at Pocatello were 6.1F above normal and for Stanley, 7.7F above normal. The mountains of southeastern Idaho saw substantial 20-30 percent losses in snow packs and many lower elevation areas completely melted out. Record high temperatures were either tied or broken at Stanley, Idaho on nine different days in March.

April 2015. Storm systems continued to track through northern Idaho the first week of April, then the pattern transitioned to one of splitting onshore flow the remainder of the month. The pattern of above normal temperatures and below normal precipitation continued as well. However, with additional cloud cover from occasional disturbances, southeastern Idaho did not see days with record high temperatures. Mountain snow packs were melting out a month ahead of time and the National Resources Conservation

Service in their Idaho Water Supply Outlook Reports dated March 1st and April 1st, took an increasingly negative position with respect to stream flow and water storage outlooks.

May 2015. A persistence of splitting wind flow located off the coast of Washington and British Columbia continued through most of May; storm systems favored the southern branch of the split and frequently tracked towards California, Nevada, and Arizona before turning northeasterly to Idaho and Wyoming. Rain fall did extend north to the Salmon-Challis National Forest but most precipitation fell along the southern border through Oakley and Raft River, to the Caribou Highlands. Above normal temperatures continued for the month with Pocatello Regional Airport reporting 1.9F degrees above normal and 3.8F degrees above normal at Stanley, Idaho. Significant storm systems affect southeastern Idaho May 7th to 9th, 15th to 17th, 19th to 20th, 22nd to 24th, and 26th to 28th. At Burley, Idaho record rainfall of 1.31 inches and 0.77 inches was reported on May 16th, 23rd, respectively. Other records included Stanley, 0.54 inches on the 12th; Pocatello, 0.38 inches on the 25th ; and Idaho Falls, 0.61 and 0.69 inches on the 15th and 16th of May.

June 2015. The first ten days of June remained unsettled with isolated to widely scattered showers across southeastern Idaho. Dry and westerly upper level winds off the Pacific prevailed nearly the entire second half of the month. This resulted in a few breezy days with almost no lightning anywhere in this area, while temperatures remained above normal. The mean monthly temperature at Idaho Falls was 5.5F degrees above normal; and at Stanley, 7.6F degrees above normal. Stanley, Idaho reported record high temperatures on 5 different days, including a high of 93F on both the 28th and 29th of the month.

July 2015. For southeastern Idaho, the development of deep subtropical moisture normally associated with the Southwest Monsoon winds, was the least observed weather pattern this month. In most years, this area is affected by the monsoon from about July 15th through September 15th. Weather disturbances affecting this area were noted July 1st, 12th, 16th, and 19th through 22nd, and most often originating over the Pacific Ocean. The presence of subtropical moisture associated with the monsoon was very limited, lasting less than one day, and the result of just a brief enhancement of southerly flow ahead of the approaching Pacific disturbance. The hurricane season in the Eastern Pacific was very active again this year, but satellite imagery showed little connection of moisture from those events with the weather observed in southeastern Idaho. The Idaho central mountains from Stanley to Salmon saw temperatures near normal, while Challis and nearly all of the Snake Plain were up to 2.0 degrees cooler than normal.

August 2015. The most active period this summer for subtropical moisture associated with the Southwest Monsoon occurred between August 3rd and 14th. Thunderstorms were active on each of these days. Stanley, Idaho reported 0.09 inches of rain on the 5th and 0.31 inches between August 8th and 9th. Idaho Falls reported 0.32 inches of rain on the 5th, 0.07 inches on the 7th , 0.59 inches on the 8th , and 0.05 inches on August 14th . Less rain fell further north at Salmon where just 0.14 inches rain was reported on the 14th, 0.03 inches on the 10th and 0.03 inches on the 30th of the month. Stanley reported record high temperatures of 90 and 91F on the 1st and 2nd of August, respectively. At the Pocatello Regional Airport, a record high temperature of 97 was reported August 29th. The last

monsoon related event of the year occurred August 26th to 30th. This overall was a lighter event, but Idaho Falls reported 0.18 inches of rain and Stanley 0.15 inches.

September and October 2015. The first few days of September were dry and non-eventful. A vigorous storm system entered the Pacific Northwest coast September 14th to 17th with widespread showers across southeastern Idaho. Measured precipitation amounts included Salmon 0.11 inches; Challis 0.41 inches; Stanley 1.25 inches; Idaho Falls 0.52 inches; Pocatello 0.78 inches; and Burley 0.43 inches of rain. At first glance this appeared to be a season ending event, but most of the rest of September and the first half of October saw well above seasonally normal temperatures. Stanley set new record highs on 14th, 15th, and 16th of October; and Burley a record high of 87F on the 10th of October. Afternoon humidity in the Snake Plain would occasionally drop to 9 to 15 percent in limited areas. It wasn't until a strong storm system came through October 18th to the 20th, followed by much cooler temperatures the third week of October, that temperatures in in the 40's and 50's became common.

4. Precipitation and Dry 1000 hour fuels by zone:

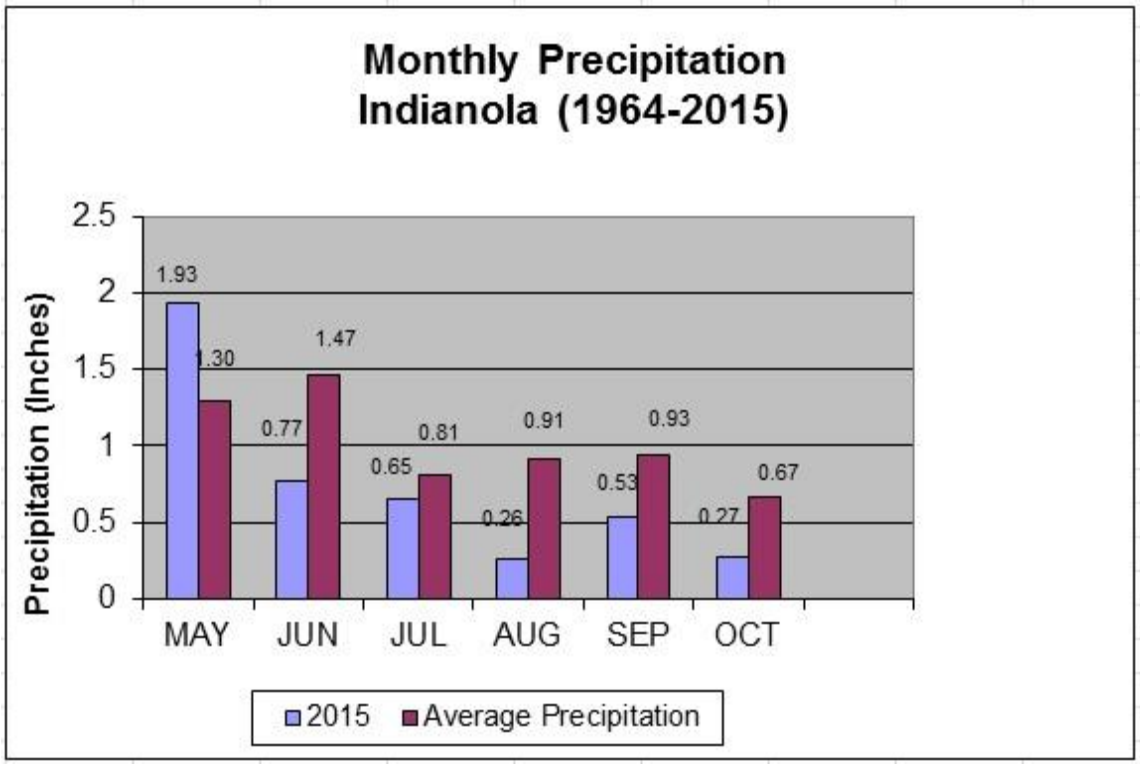

Figure 4.1(a) Observed and average precipitation at Indianola RAWS site, Fire Weather Zone 475.

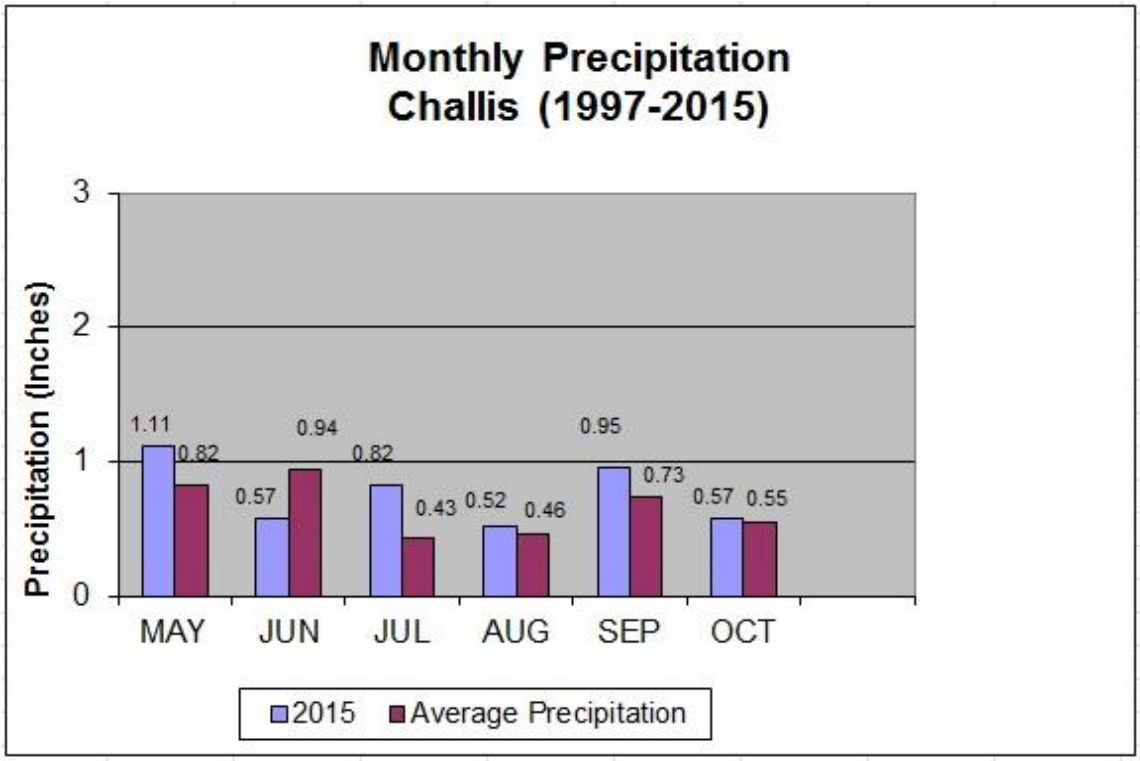

Figure 4.1(b) Observed and average precipitation at Challis RAWS site, Fire Weather Zone 476.

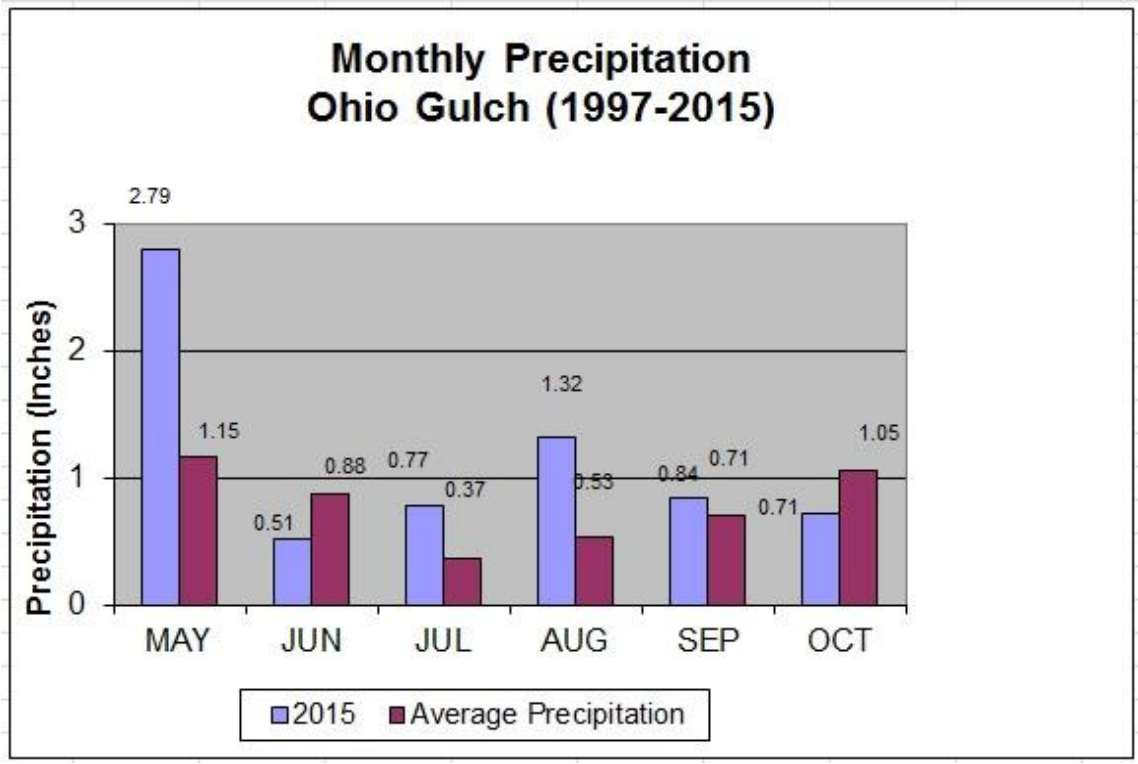

Figure 4.1(c) Observed and average precipitation at Ohio Gulch RAWS site, Fire Weather Zone 422.

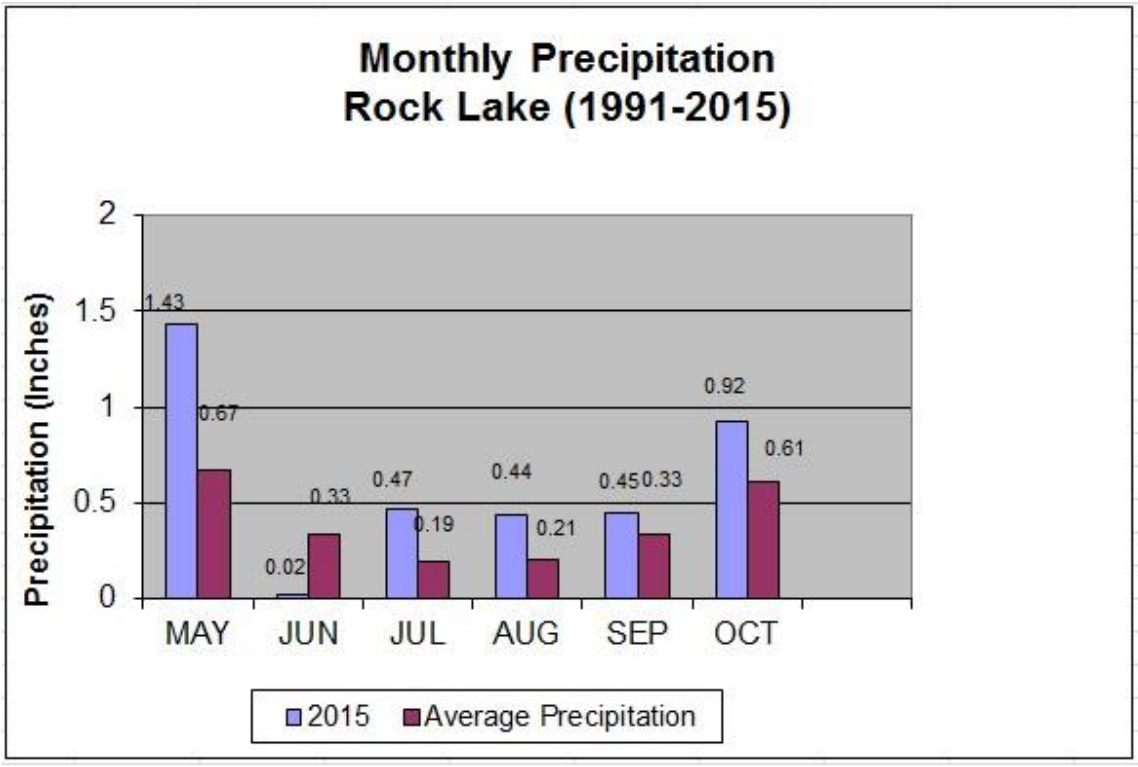

Figure 4.1(d) Observed and average precipitation at Rock Lake RAWS site, Fire Weather Zone 425.

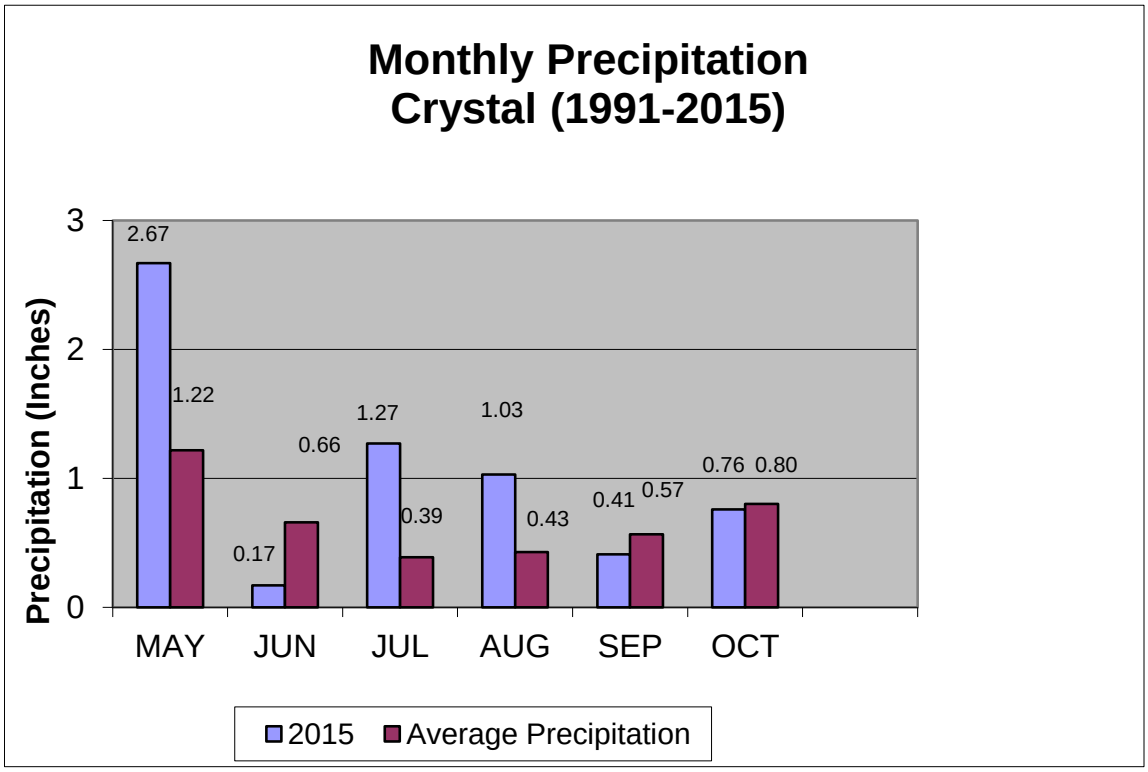

Figure 4.1(e) Observed and average precipitation at Crystal RAWS site, Fire Weather Zone 410.

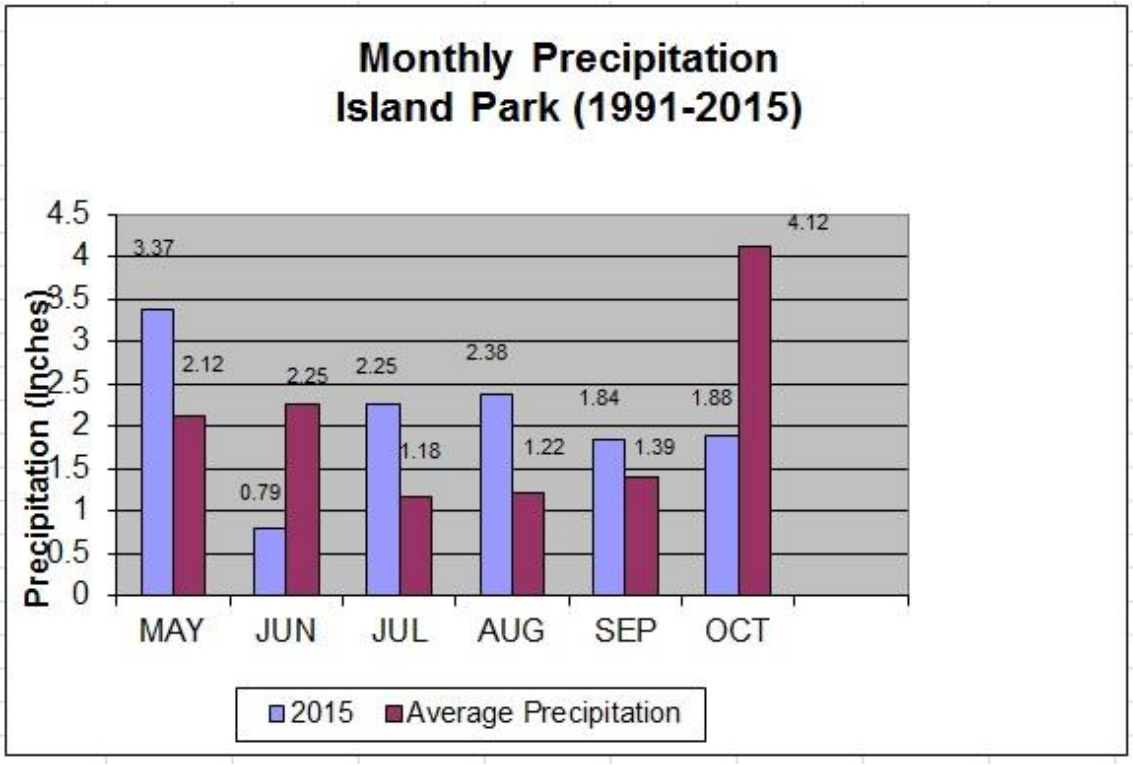

Figure 4.1(f) Observed and average precipitation at Island Park RAWS site, Fire Weather Zone 411.

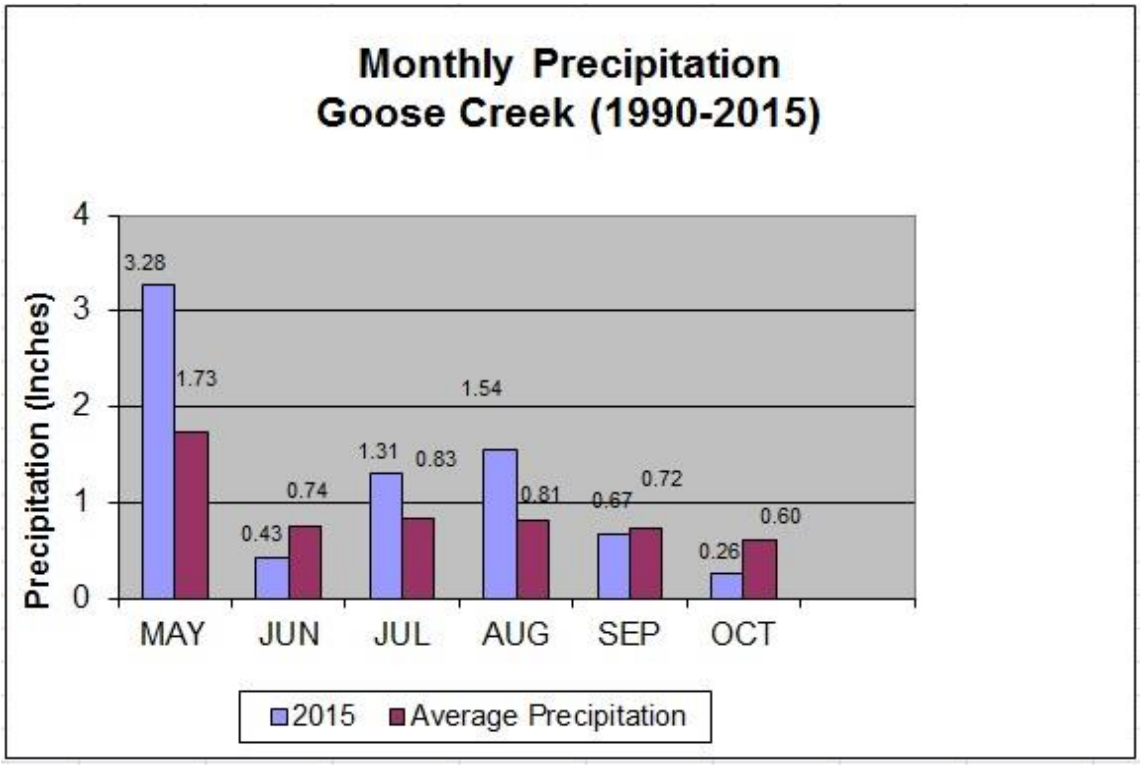

Figure 4.1(g) Observed and average precipitation at Goose Creek RAWS site, Fire Weather Zone 427.

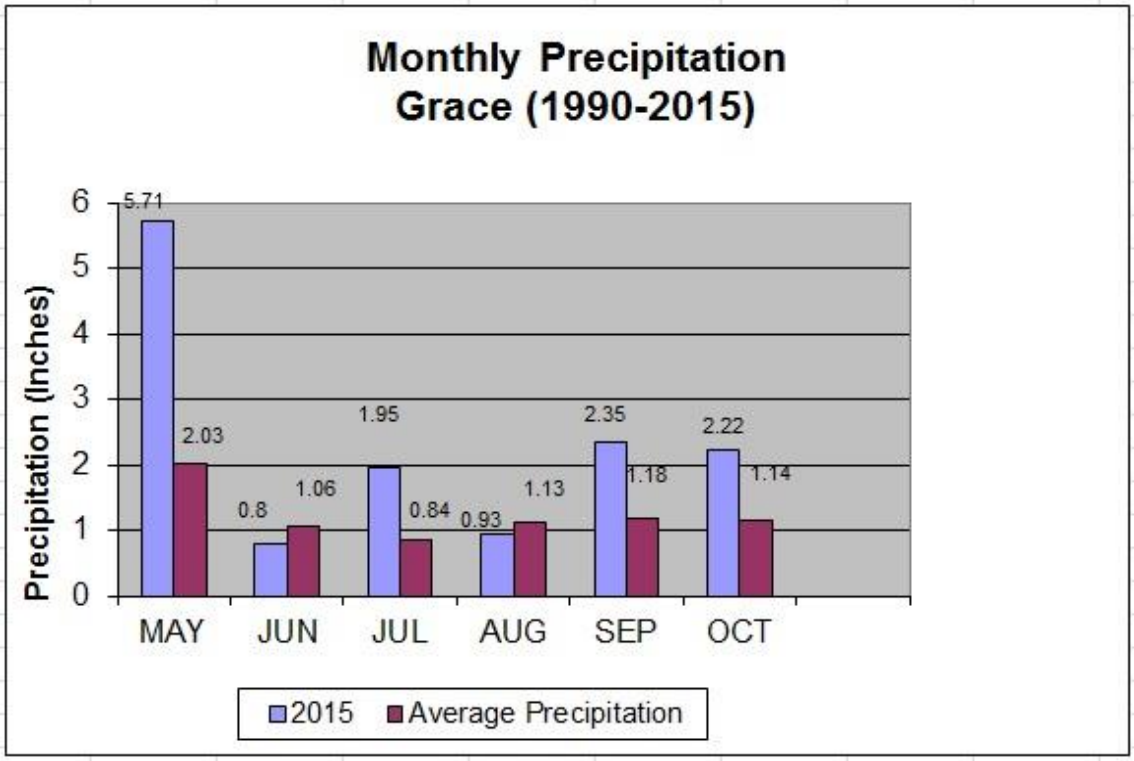

Figure 4.1(h) Observed and average precipitation at Grace RAWS site, Fire Weather Zone 413.

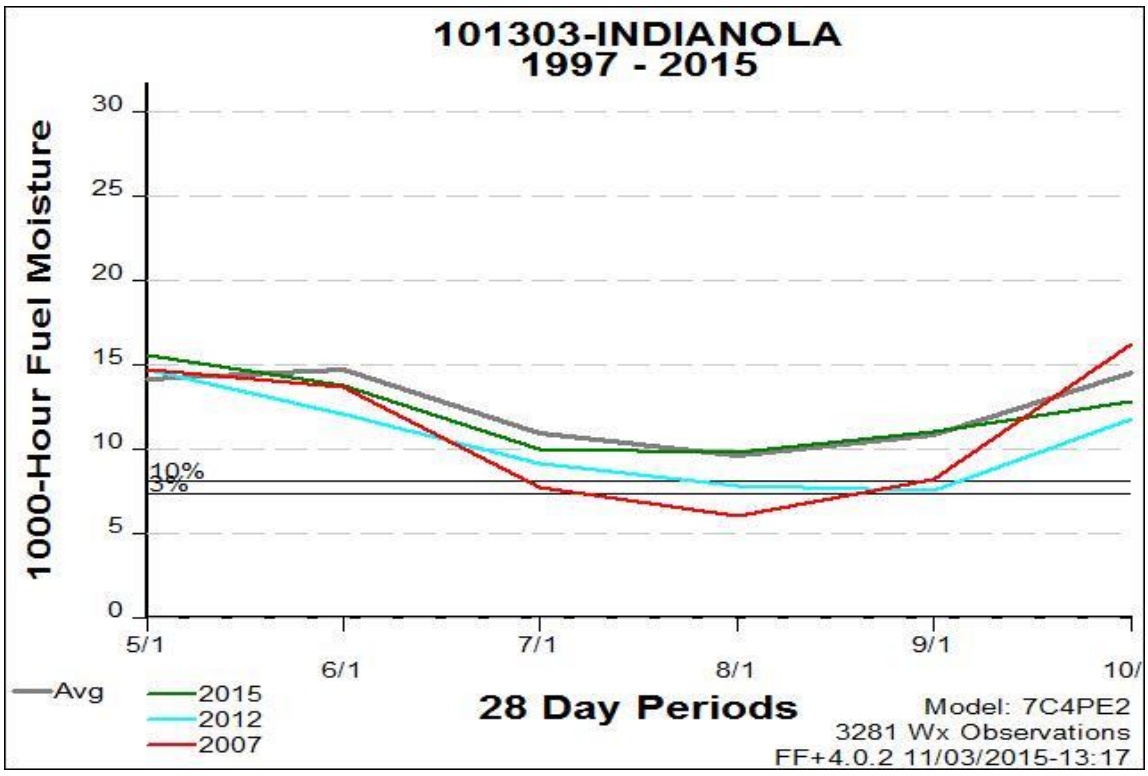

Figure 4.2(a) Observed and average 1000 Hour Fuel Moisture at Indianola RAWS site, Fire Weather Zone 475.

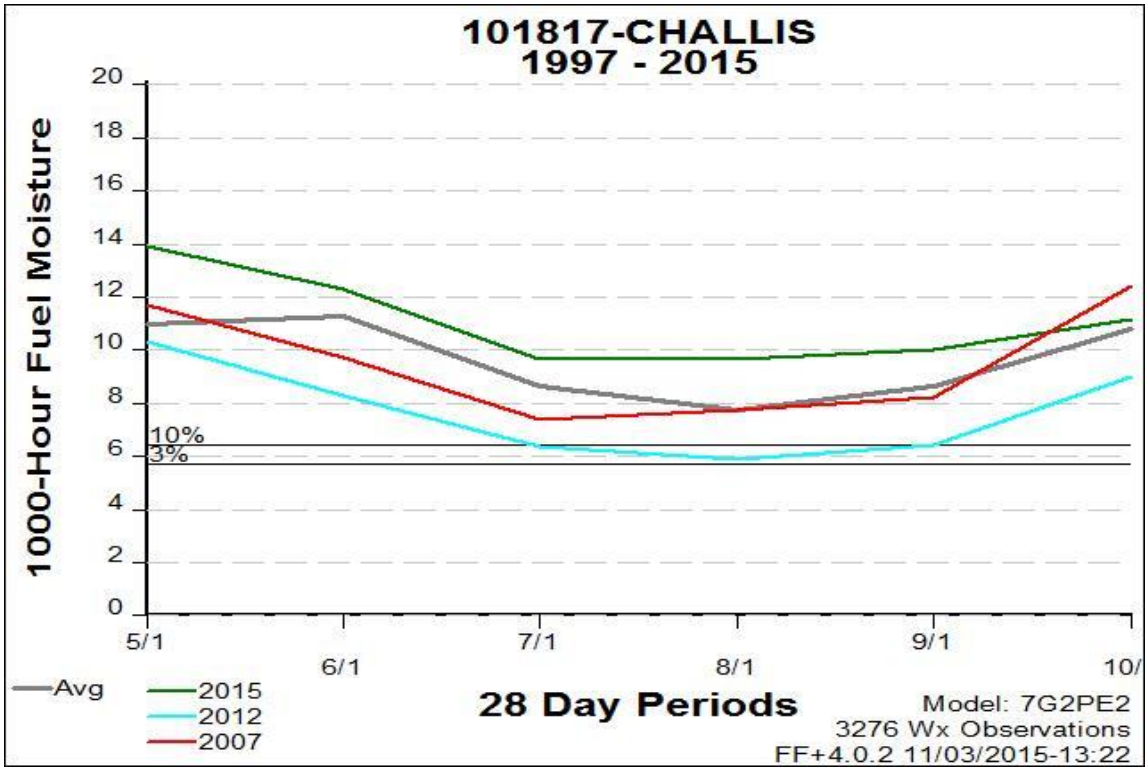

Figure 4.2(b) Observed and average 1000 Fuel Moisture at Challis RAWS site, Fire Weather Zone 476.

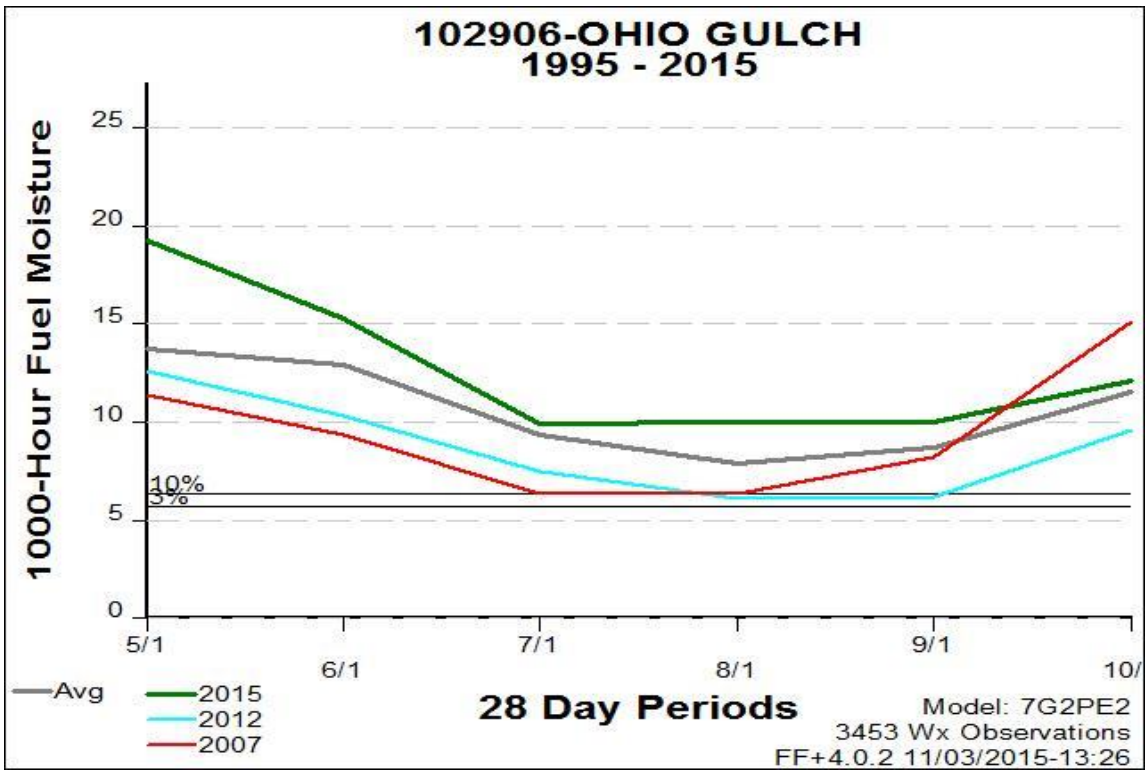

Figure 4.2(c) Observed and average 1000 Fuel Moisture at Ohio Gulch RAWS site, Fire Weather Zone 422.

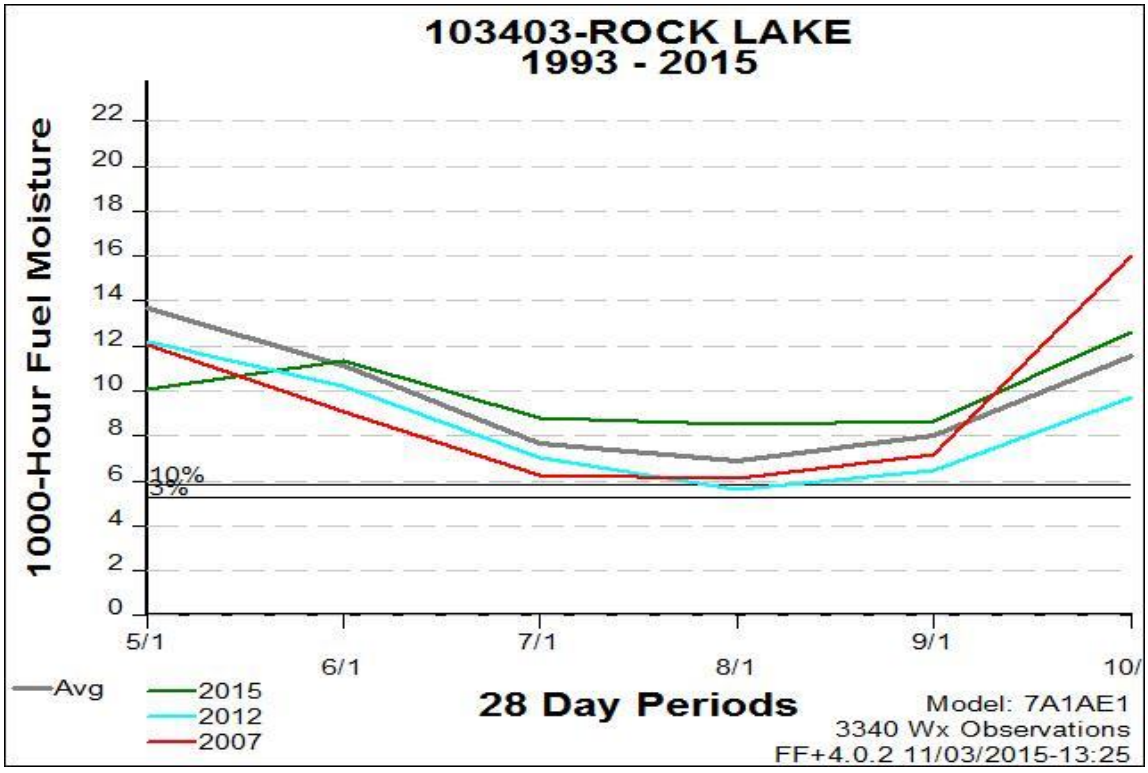

Figure 4.2(d) Observed and average 1000 Hour Fuel Moisture at Rock Lake RAWS site, Fire Weather Zone 425.

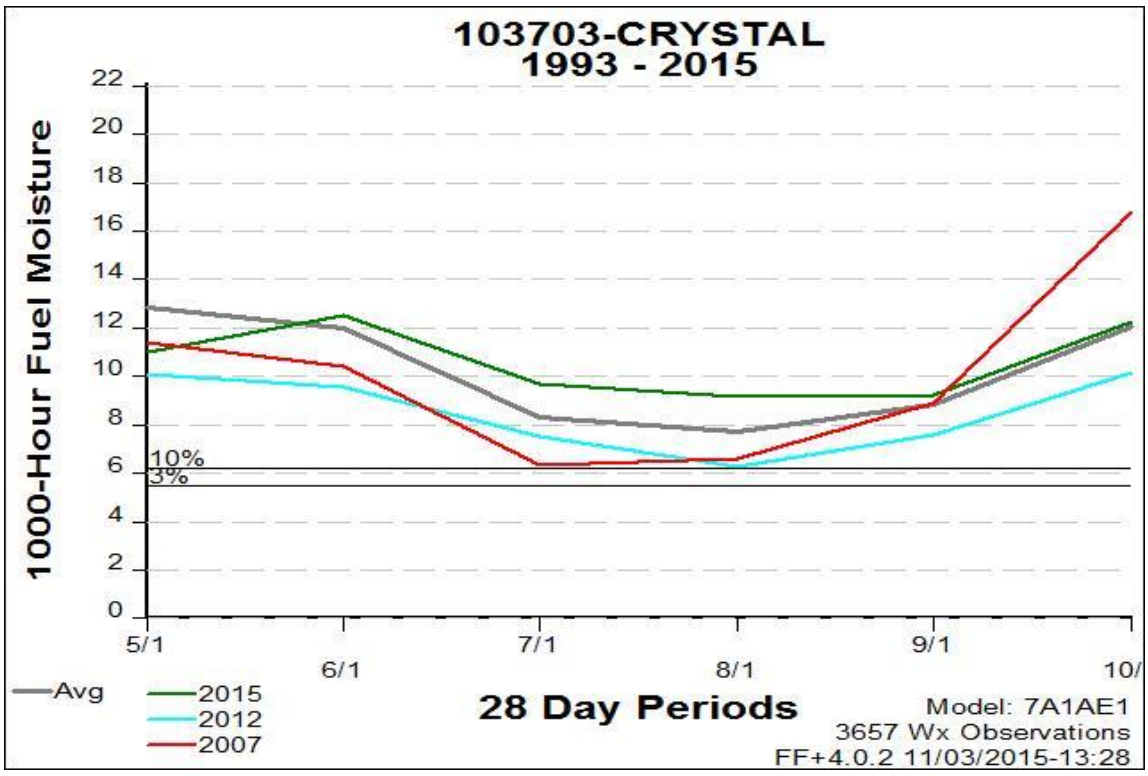

Figure 4.2(e) Observed and average 1000 Hour Fuel Moisture at Crystal RAWS site, Fire Weather Zone 410.

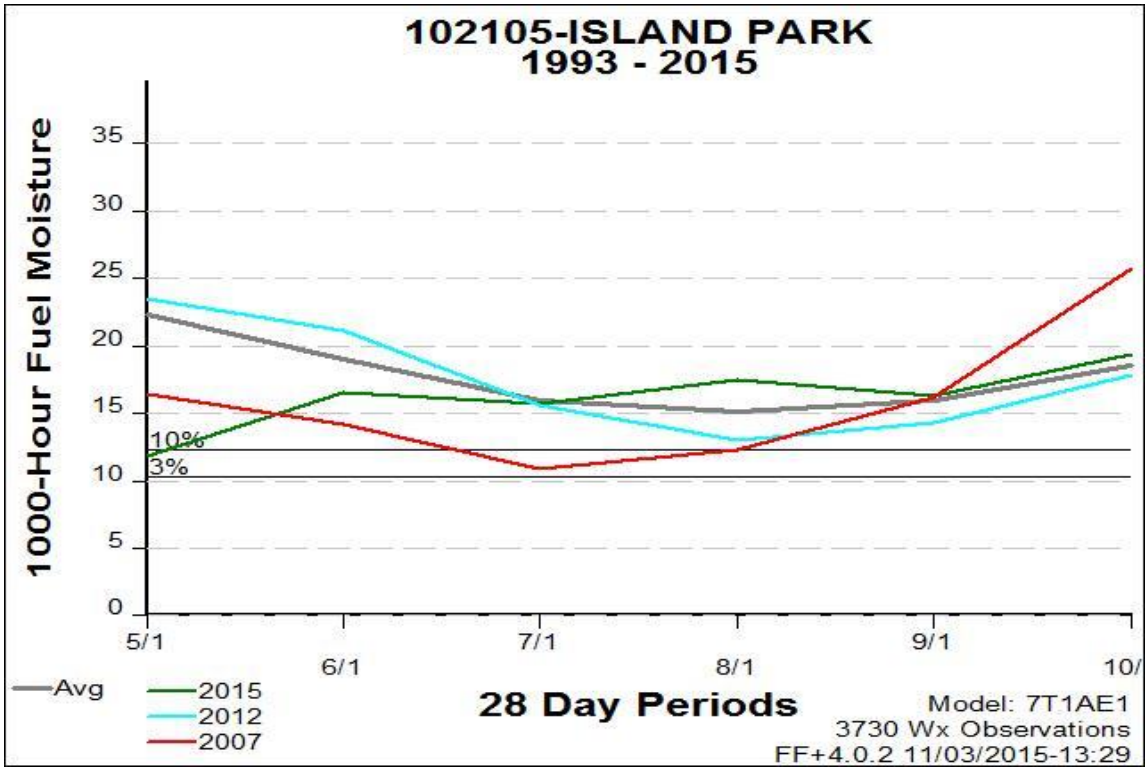

Figure 4.2(f) Observed and average 1000 Hour Fuel Moisture at Island Park RAWS site, Fire Weather Zone 411.

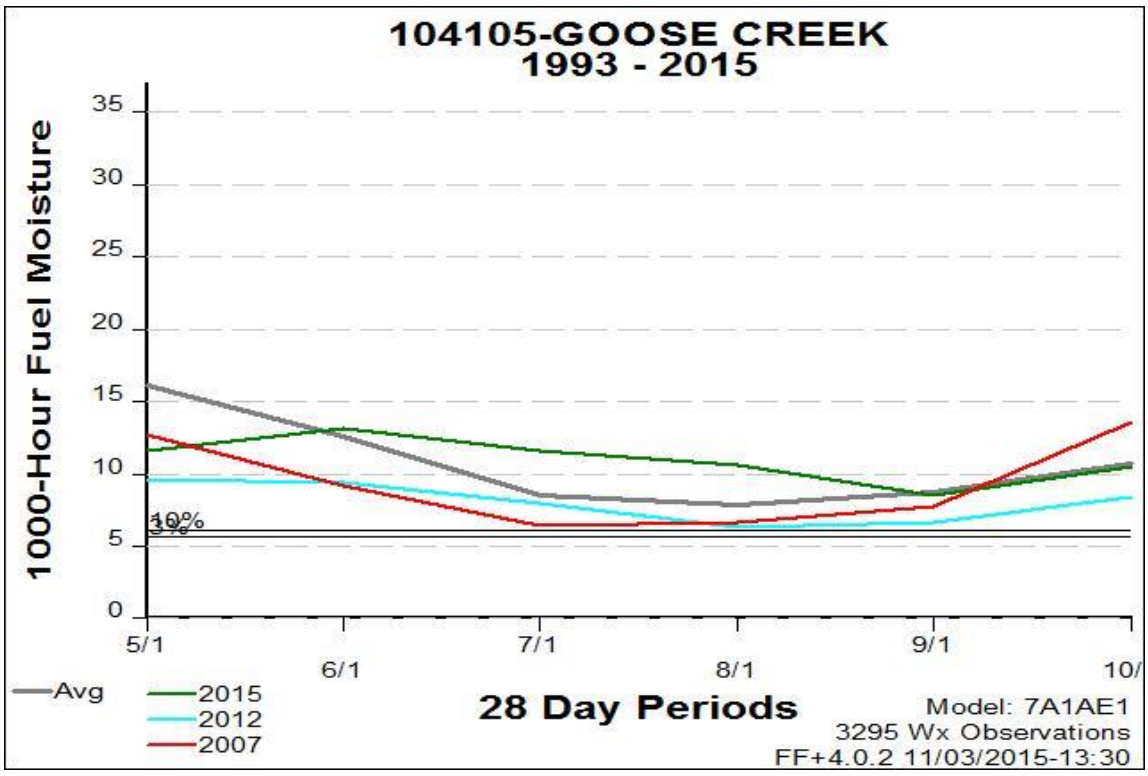

Figure 4.2(g) Observed and average 1000 Hour Fuel Moisture at Goose Creek RAWS site, Fire Weather Zone 427.

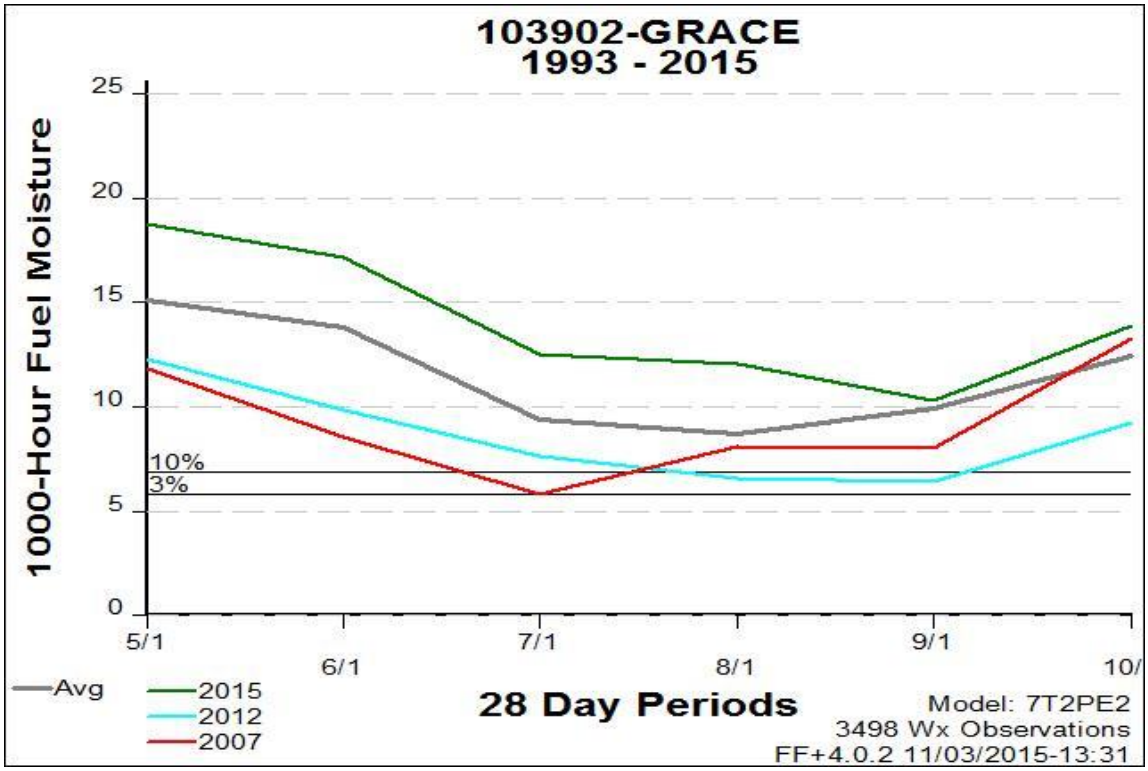

Figure 4.2(h) Observed and average 1000 Hour Fuel Moisture at Grace RAWS site, Fire Weather Zone 413.

5. Office Operations:

5.1 Red Flag Verification

1. Formal verification of Red Flag Warnings in Southeast Idaho began with the 2000 fire season and is now a permanent part of the fire weather program. Verification is based on current Red Flag Warning and Fire Weather Watch criteria that has been coordinated with local land management agencies and published in the Great Basin Annual Operating Plan for Fire Weather and Predictive Services. Current criteria for the Pocatello Fire Weather District are shown in paragraph 5.1.2 below.

Events considered "short fused" or having time lengths typically less than six to twelve hours (Lightning) were split out from other events occurring over a longer time period, reference tables 5.1 (a-d) below.

2. Conditions that indicate a Red Flag Event:

Fire Weather Watches and Red Flag Warnings, are issued for conditions of very high or extreme fire danger (as determined by land management agencies) and dry fuels, in combination with one of the following:

a. Widely scattered or greater ($\geq$ 25% of aerial coverage) thunderstorm activity. NOTE: Beginning with the 2014 fire season, the aerial coverage requirement for thunderstorms was increased from 15 to 25 percent.

b. Wind gusts for any three or more hours $\geq$ 25 mph for Southeast Idaho Mountains, $\geq$ 30 mph for the Snake River Plain and relative humidity is $\leq$ 15 percent.

c. In the judgment of the forecaster, weather conditions will create a critical fire control situation. These conditions may include strong microburst winds, passage of a cold front or a strong wind shift.

Red Flag criteria are developed from a local knowledge of fuel types, terrain, and weather conditions that are common or unusual to the area, historical fire behavior, and judgment of the local land management agencies. Because the criteria for issuing Red Flag products can vary from one district to another, these verification results are not necessarily comparable with other forecast offices.

3. Methodology:

Verification of Red Flag Warnings was conducted on a zone by zone basis. Example: If a warning for strong wind was issued for fire weather zones 425 and 410, but strong winds were observed only in zone 410, then this counts as two warnings, one that verified and one false alarm. Also, if strong winds were observed in zone 427, but no warning was issued, then this would be counted as one missed event.

Sources of verification included Remote Automated Weather Stations (RAWS), Meteorological Reporting Stations (METAR), lightning data; WSR-88D Doppler Weather Radar estimated precipitation, volunteer weather spotter information such as heavy rain events, and reports of observed fire behavior from personnel in the field.

Local MESONET reporting networks maintained by Idaho Department of Transportation and the Idaho National Laboratory were not used as a source of verification for wind events since there are differences in observing standards at these sites.

Statistical parameters were calculated as follows:

Probability of Detection	POD = a/(a+c)
Critical Success Index	CSI = a/(a+b+c)
False Alarm Rate	FAR = 1-[a/(a+b)]

where

a = the number of correct warnings (verified)
b = the number of incorrect warnings (not verified)
c = the number of events not warned

4. Sources of error:

Red Flag criteria for wind events in the Great Basin were modified based on interagency agreement set forth in the Great Basin Fire Weather Operating Plan for 2005 and continued without change until present. Beginning with the 2008 fire season, the distinction between wet and dry thunderstorms was eliminated from the Red Flag criteria owing to concerns of lightning strikes and fire ignition occurring outside the main thunderstorm rain shaft. A thunderstorm was previously considered "dry" if it produced little or no precipitation (< 0.10 inch). The mid-point of a forecast range serves as the break point for watch/warning issuance. This effectively adds an element of representativeness to the verification process. Therefore, any inference of trends from verification results must consider changes made to the established criteria for a Red Flag Event and verification procedures in past years. The Red Flag Event criteria and verification procedures also changed in 2002 and 2004 and 2014. Please reference past issues of this Fire Weather Annual Report.

Forecaster skill level and confidence may be lower for peak wind gusts over sustained wind speed. Downward transport of momentum in the atmosphere, complex terrain, inversions of temperature lapse rate, variations in surface insolation owing to vegetative ground cover, reflectivity, absorption and transmissivity of the atmosphere, and the energy phase change of water in the atmosphere all impact the observed peak surface wind gust. Not all of these processes are sufficiently represented by available computer modeling and operational forecaster techniques.

Personal judgment was required to determine when lightning was more than a widely scattered event and significant in areal coverage.

Field observations of fire behavior may serve as an important indicator of Red Flag conditions. On rare occasion this may affect the best judgment of the forecaster and land management personnel. On days or in locations where there were no on-going fires this information was not available.

In paragraph 2c above, judgment of the forecaster and land management personnel is permitted to override the strict criteria of relative humidity and wind gusts. The general consensus is there is enough uncertainty in the fire environment (fuel, weather and topography) and this should remain a necessary and important element of the Red Flag criteria. This also requires a certain amount of judgment in the verification process.

Both RAWS and METAR stations report instantaneous wind gusts, but the observing standards for height of the wind sensor can vary.

On rare occasion the fuels were defined as critical at an elevation below that of existing RAWS and METAR stations.

Skill and lead-time vary with the type of event.

5. Decision Criteria

Wind – The number of available RAWS and METAR sites varied both with the area warned and location where fuels were defined as critical. Every attempt was made to judge the representativeness of wind conditions.

Lightning – Archived lightning data was used to determine verification. A good deal of judgment was needed to determine if the observed lightning was more than an isolated event. Some thunderstorms are more efficient lightning producers than others.

Wet versus dry thunderstorms – this element was removed from the Red Flag Criteria beginning with the 2008 fire season. The number of reported fire starts is not a reliable indicator since lightning strikes can occur outside the thunderstorm precipitation shield striking drier fuels and a single thunderstorm can be long lived producing numerous strikes over some distance.

Other – Reports of observed fire behavior from personnel in the field continue to be useful when dealing with long-term drought conditions and days of reported low relative humidity. If sustained fire runs are observed but available observations do not necessarily support warning criteria, the judgment would likely fall on the side of safety of life and property.

6. Results:

Red Flag Warning criteria were met on a total of 8 different days during this fire season in the Pocatello Fire Weather District. Strong gusty winds and low relative humidity were a factor on 4 of these days; thunderstorms and lightning activity were a significant factor on 4 of these days. There were 2 events (zones) occurring on 2 different days when Red Flag Warning criteria were met without a warning in effect.

	May	June	July	August	September	October	Total
Total # watches	0	0	0	9	0	0	9
Total # of warnings	0	0	0	25	8	0	33
Number warnings that were preceded by a watch	0	0	0	9	0	0	9
Warnings verified (a)	0	0	0	18	6	0	24
Warnings not verified (b)	0	0	0	7	2	0	9
Events not warned (c)	0	0	0	1	1	0	2

Table 5.1(a). Combined synoptic (long term) and short fused Red Flag event products issued in the WFO Pocatello Fire Weather District during the 2015 season.

	May	June	July	August	September	October	Total
Total # watches	0	0	0	9	0	0	9
Total # of warnings	0	0	0	15	8	0	23
Number warnings preceded by a watch	0	0	0	9	0	0	9
Warnings verified (a)	0	0	0	9	6	0	15
Warnings not verified (b)	0	0	0	6	2	0	8
Events not warned (c)	0	0	0	1	1	0	2

Table 5.1(b). Synoptic scale Red Flag event products issued in the WFO Pocatello Fire Weather District during the 2015 season. Example cold fronts, low relative humidity, strong pressure gradient related winds.

	May	June	July	August	September	October	Total
Total # of watches	0	0	0	0	0	0	0
Total # of warnings	0	0	0	10	0	0	10
Number warnings preceded by a watch	0	0	0	0	0	0	0
Warnings verified (a)	0	0	0	9	0	0	9
Warnings not verified (b)	0	0	0	1	0	0	1
Events not warned (c)	0	0	0	0	0	0	0

Table 5.1(c). Short fused Red Flag event products issued in the WFO Pocatello Fire Weather District during the 2015 season. Example: lightning events and strong micro burst winds.

Red Flag verification resulted in the following:

	Synoptic Events	Short Fused Events (Lightning)	All Events	3 year average
Probability of detection POD	0.88	1.00	0.92	0.91
Critical success index CSI	0.60	0.90	0.69	0.68
False alarm rate FAR	0.35	0.10	0.27	0.27
Average lead time for Watches			33 hrs. 28 min	37 hrs. 58 min
Average lead time for Warnings	17 hrs. 40 min.	1 hrs. 44 min.	13 hrs. 10 min	12 hrs. 21 min

Table 5.1(d). Combined synoptic (long term) and short fused Red Flag event products issued in the WFO Pocatello Fire Weather District during the 2015 season.

7. Implications:

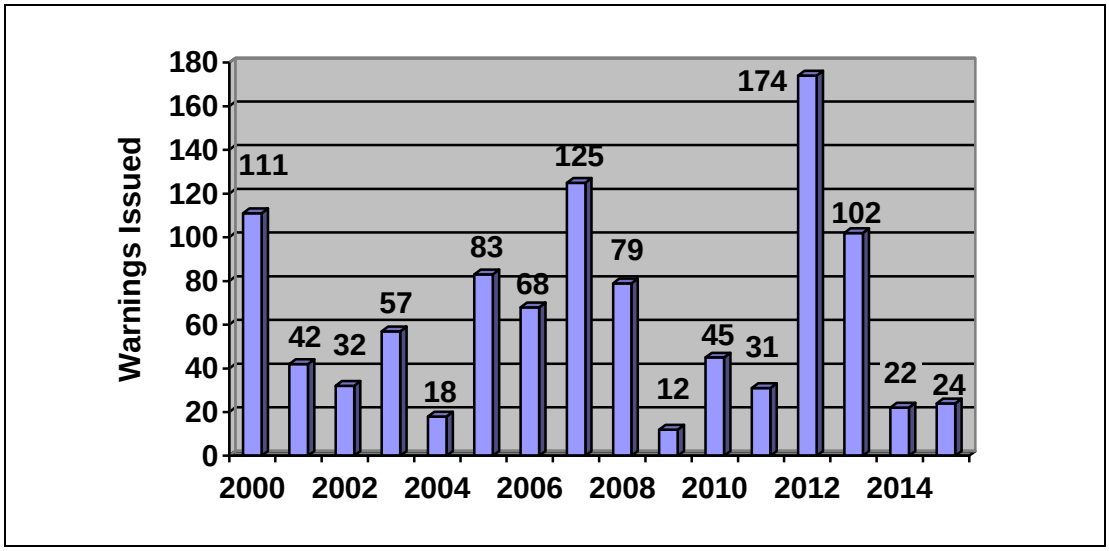

Figure 5.2 Historical Red Flag Warnings in Southeast Idaho; based on one warning per fire weather zone meeting criteria. In dry years the number of zones with "critical" fuels generally increases, and so does the number of warnings. The Red Flag criteria have changed several times since the 2000 fire season and are not necessarily comparable.

The 2015 fire season in Southeast Idaho was the fourth shortest season with respect to the Red Flag program, since the year 2000 when this office began issuing Fire Weather Forecasts.

5.2 Spot Forecasts and briefings prepared by WFO Pocatello:

Wildfires	64	Verbal Phone Briefings	8
Prescribed Fires	140	For fire support	186
HAZMAT	0	Search & Rescue	02
Backup	0	Emergency management	05
Exercise	0	Exercise	0
Search & Rescue	11	Total	201
Total	215		

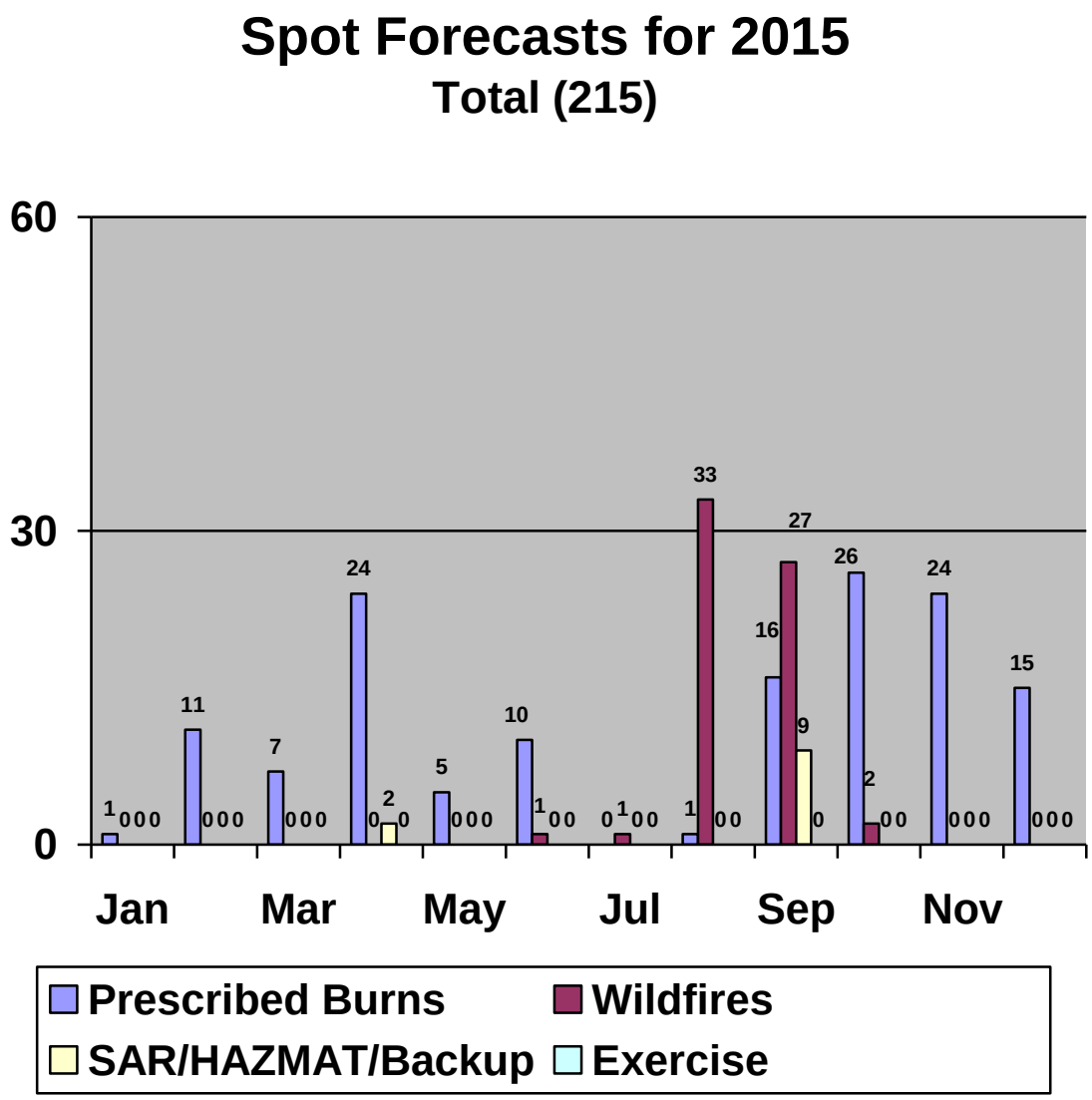

Figure 5.3(a) Spot Forecasts prepared by the Pocatello Fire Weather District during the 2015 fire season.

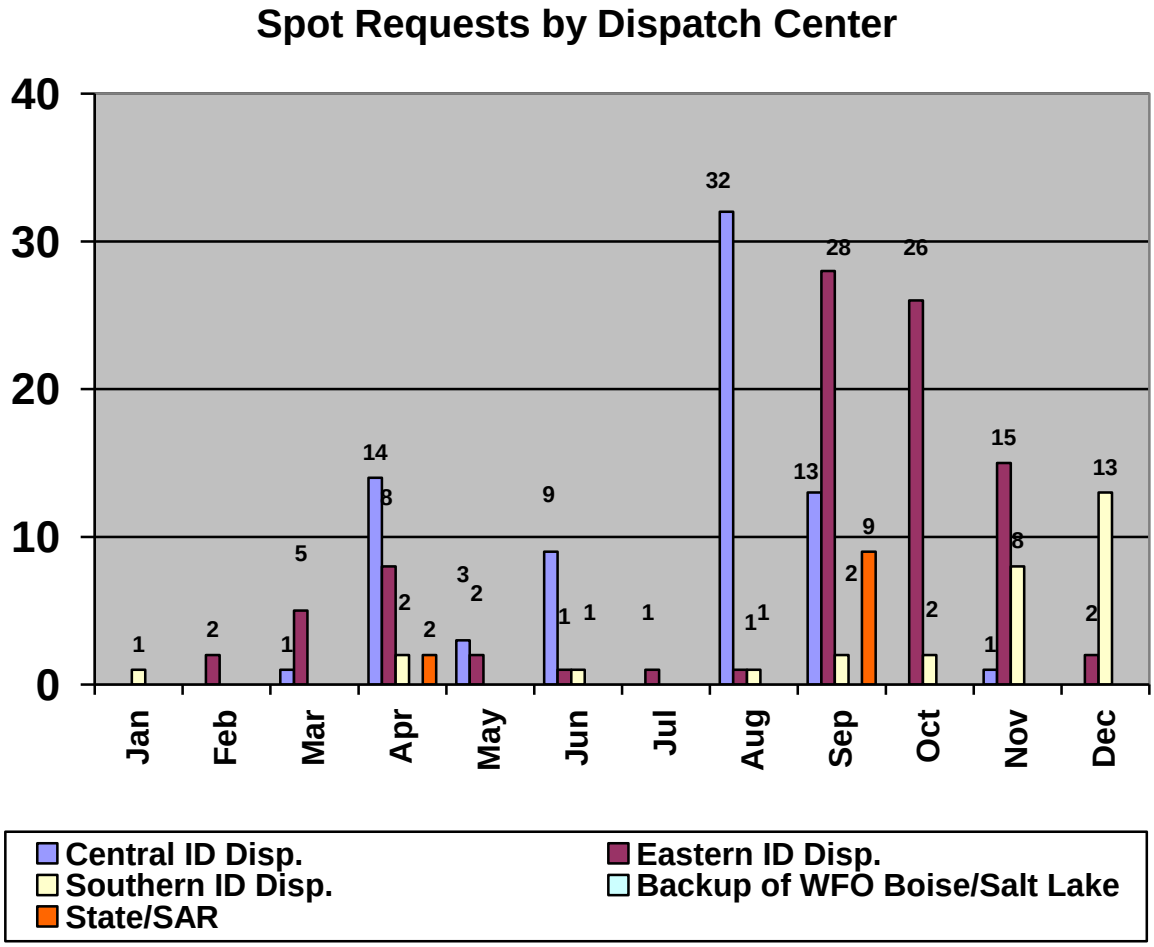

Figure 5.3(b) Spot Forecasts requested by dispatch area during the 2015 fire season in Southeast Idaho.

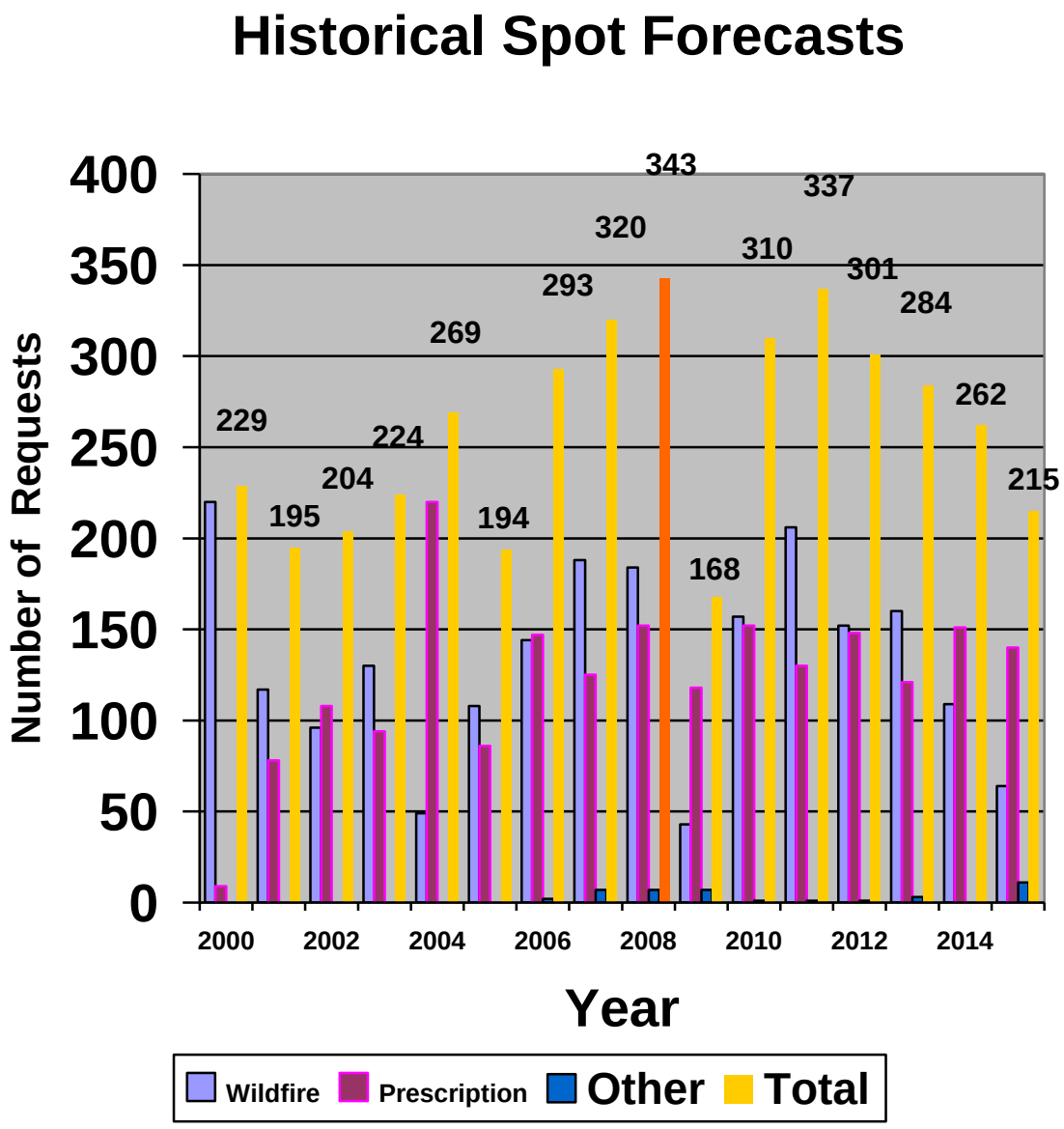

Figure 5.4 Historical trends in Spot Forecast requests for the Pocatello Fire Weather District. There were 215 SPOT forecasts provided in 2015. The record for the National Weather Service Office in Pocatello is 343 SPOT forecasts in 2008.

5.3 Fire Dispatches Supported by WFO Pocatello: There were three Type I IMET dispatches this fire season resulting in 37 man days served out of the office.

Date	*Dispatch Location*	*Type I Incident Meteorologist*
August 16 to August 27, 2015	Sucker Creek Fire Helena NF near Lincoln, Montana	Jack Messick
August 28 to September 7, 2015	NE Kootenai Complex Kootenai NF Near Trego, Montana	Jack Messick
September 11 to September 24, 2015	Teepee Springs Wildfire Payette NF 20S Riggins, Idaho	Jack Messick

Table 5.3a Type I Incident Meteorologist Dispatches by WFO Pocatello (in support of onsite IMT operations).

Date	*Dispatch Location*	*Type II Incident Meteorologist*
March 10, 2015	Cutler Dam Notification Exercise	Staff
April 10, 2015	Fort Hall Emergency Management Exercise Fort Hall, Idaho	Vern Preston, Corey Loveland
April 16, 2015	American Falls Dam Table Top Exercise	Vern Preston
May 27, 2015	Magic Dam Exercise	Vern Preston
July 29, 2015	DSS Driggs, Idaho Shakespeare Festival	Staff
Jul 30-31, 2015	DSS ISU Quad Shakespeare Festival	Staff
Aug 3-8, 2015	Bannock county Fair	Various staff
Aug 6-9, 2015	ShoBan Festiva, Fort Hall, Idaho	Staff
Aug 3, 2015	Dam Break Exercise	Staff
September 2 to 13, 2015	Eastern Idaho State Fair, Blackfoot, Idaho Daily Decision Support	Various staff
Aug 28, 2015	Ririe Dam Exercise	Staff
Aug 30, 2015	Palisades Dam Exercise	Staff
October 27, 2015	Snake Oil Functional Exercise, WFO Pocatello	Alex Desmit

Table 5.3b Type II Incident Meteorologist Dispatches or local support by WFO Pocatello (at an Emergency Operations Center, Area Command, or Joint Field Office location).

5.4 Training: WFO Pocatello staff participated in the following training courses during the 2015 season.

Forecaster	Training situation
Jack Messick	IMET Continuity of Excellence Exercise, Boise, Idaho, April 6-10, 2015.
Karrie Schmidt	IMET Reimbursable Portion of the Virtual IMET Workshop, March 25, 2015.
Jack Messick	Instructor S-390 Introduction to Wildland Fire Behavior Calculations, Caribou National Forest, held at Eastern Idaho Technical College, Idaho Falls, Idaho, May 18, 2015.
Dean Hazen, Bob Survick, Mike Huston	Montana Weather Forecast Office Mini-Summit on Fire Weather, Great Falls, Montana, April 28-30, 2015
Jack Messick	Instructor S-290 Intermediate Wildland Fire Behavior, May 15, 2015, Snake River Hot Shots, Pocatello, Idaho.
Bob Survick	Pre-Fire Season Station Meeting for all forecasters, National Weather Service Office, Pocatello, Idaho May 19, 2015.
Dean Hazen	Instructor S-290 Intermediate Wildland Fire Behavior, Salmon-Challis National Forest, Salmon, Idaho May 27, 2015.
Dean Hazen	Instructor S-290 Intermediate Wildland Fire Behavior, Twin Falls, Idaho June 1-2, 2015.
Mike Huston Dawn Harmon Alex Desmet	Completed ICS-300 at Bonneville County Sheriff Office, Idaho Falls, July 14-15, 2015.
Corey Loveland	DSS Bootcamp – National Weather Service Training Center, Kansa City, August 10-14, 2015
Corey Loveland	NASA ARSET Remote Sensing for Wildfire Applications workshop, Idaho State University, October 6-8, 2015.

5.5 Field Visits: The staff at WFO Pocatello participated in 38 interagency meetings this year.

Location	Dates
Post Season Visit Eastern Idaho Interagency Fire Center Idaho Falls, Idaho Mike Huston	October 27, 2014
Post Season Visit South Idaho Interagency Dispatch Cent. Shoshone, Idaho Mike Huston	October 29, 2014
Post Season Visit Central Idaho Interagency Fire Center Salmon, Idaho Mike Huston	December 3, 2014
Gate City Interagency Fire Front Meetings, Pocatello, Idaho	Monthly
Local Emergency Planning Committee Hydrology and Fire Weather Outlook Various Counties and dates Vern Preston, Corey Loveland	18 meetings
Ground Hog Day Chili Cook-off Southeastern District Health Office Pocatello, Idaho	January 30, 2015
Great Basin Predictive Services, And National Weather Service Annual Operating Plan Meeting, Northern Utah IFC, Draper, UT. Dean Hazen and Bob Survick	February 19-20, 2015
Sawtooth NF Avalanche Cent. Travis Wyatt, Jeremy Schultz	March 5-6, 2015
Pre-Season Meeting Central Idaho Interagency Fire Center Salmon, Idaho Dean Hazen, Mike Huston, and Bob Survick	March 30-31, 2015

Pre-Season Meeting — April 20, 2015
South Central Idaho Interagency Dispatch Center
Shoshone, Idaho
Dean Hazen, Mike Huston, and Bob Survick

Pre-Season Meeting — April 23, 2015
Eastern Idaho Interagency Fire Center
Idaho Falls, Idaho
Dean Hazen, Mike Huston, and Bob Survick

General Forecaster Meeting — June 9, 2015
WFO Pocatello, Idaho
Greg Burch, FMO-Portneuf Zone
Customer Viewpoint of Impact Mapper
And the Preacher Fire 2013

Logan Avalanche Center Meeting — January 20, 2015
Logan, Utah

Gate City Interagency Fire Front — June 24, 2015
Chubbuck, Idaho

Bureau Homeland Security — January 26, 2015
Table Top Exercise
Twin Falls, Idaho

Idaho Emergency Management — February 2-3, 2015
State Conference
Boise, Idaho

Avalanche CAP Meeting — February 9, 2015
Sawtooth Avalanche Center
Sun Valley, Idaho

Montana MiniSummit DSS — February 17-19, 2015
WFO Great Falls
Great Falls, Montana

BHS Planning Meeting — February 27, 2015
Pocatello, Idaho

Spring Cooperators Meeting — April 28, 2015
South Central Idaho Interagency
Dispatch Center
Shoshone, Idaho
Vern Preston

Spring Operations Meeting May 12, 2015
Eastern Idaho Interagency Fire Center
Idaho Falls, Idaho
Dean Hazen, Mike Huston, Bob Survick

5.6 Support to Type I IMETs dispatched to the WFO Pocatello area of responsibility:

Ryan Walburn, Monterey, CA assigned to the Bob Cat Wildfire near Salmon, ID from August 20 through August 24, 2015.

Ryan Walburn, Monterey, Ca. assigned to the Elevenmile Fire near Challis, ID from August 25 through September 8, 2015.